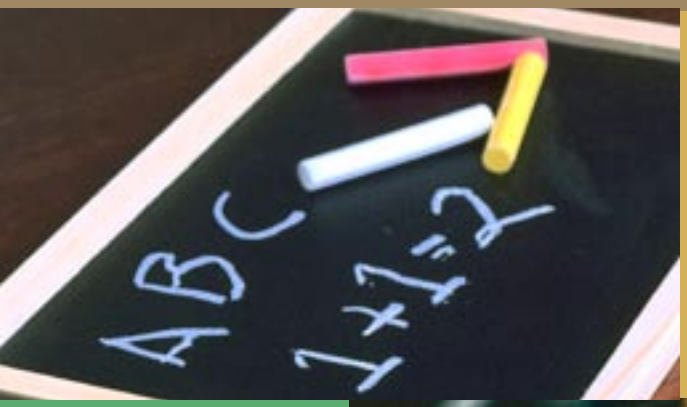
Effective Early Childhood Programs



Turning Knowledge Into Action

Susan H. Landry

A note from the sponsors

The University of Texas System's Health Science Center at Houston and Rice University's James A. Baker III Institute for Public Policy are proud to support the writing, publication, and distribution of this book. Derived from scientific results, the book contains practical details for providing high-quality experiences in early childhood programs that promote the learning and development of three- and four-year-old children. This initiative was undertaken as a public service to the State of Texas.

The formal learning system is a continuum from birth to preschool to primary school to secondary education to higher education to college graduation and beyond. Each step depends on the successful completion of the prior step in order to prepare a child to meet the challenges of advancement. Inadequate preparation often leaves a child stuck in a learning and development level that too often obstructs their forward progress through the remaining continuum. Although all steps in the continuum deserve our attention and resources, the penalty is harshest on children who from birth to age five have not been adequately prepared to enter kindergarten and maximize the opportunity.

The motivation of Susan Landry and the team assembled for this book project was to harvest the knowledge that has been gained from the sciences of brain development, human development, and early childhood education and development and then translate that knowledge into usable guidelines for organized programs for three- and four-year-old children. The guidelines are firmly grounded in science. Three hundred twenty-two references, organized by chapter, are given in the back of the book.

The objective is to provide the opportunity for every child in Texas to become optimally ready to learn by entry to kindergarten, and thus, to build a solid foundation on which to continue to achieve success in the education continuum.

The ultimate long-term goal of this education initiative is to enhance the knowledge base, skill levels, and capacities of all residents of Texas. Achievement of this goal will provide a highly capable workforce, promote economic vitality, and contribute to better health and sense of well-being statewide. Although the book has been prepared with concern for children in Texas, we hope that early childhood education and development initiatives in other states also will find it useful.

Mark G. Yudof
Chancellor
University of Texas System

David W. Leebron
President
Rice University

Effective Early Childhood Programs: Turning Knowledge Into Action

Susan H. Landry, PhD
The Michael Matthew Knight Professor of Pediatrics
Chief, Division of Developmental Pediatrics
University of Texas Health Science Center

The University of Texas Houston Health Science Center

Produced in conjunction with
Texas Program for Society and Health
The James A. Baker III Institute for Public Policy
Rice University

Major contributions to this book were also made by:
Dr. Alvin Tarlov
Lois Kerschen
Laura Lomax-Bream
Michelle Precourt Debbink

"Many things can wait; children cannot. Today, their bones are being formed, their blood is being made, their senses are being developed. To them, we cannot say 'tomorrow.' Their name is today."

—Gabriela Mistral
Nobel Laureate in Literature (1945)

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Chapter I.
Building the Foundation: Early Childhood Education and Development

Young children have an innate desire to learn. That desire can be supported or undermined by early experiences.[1]

The learning experiences of the preschool years can influence the rest of a child's life. This early period in development provides a foundation that guides children academically, socially, and emotionally. The exposures, opportunities, and guidance a 3- or 4-year-old is given contribute greatly to the person he or she will become as an adult. A simple illustration of the cascading effects (figure 1) of positive early childhood experiences demonstrates how such experiences can alter children's circumstances for the rest of their lives—in essence, it illustrates the positive change in a child's life trajectory.

Figure 1*

Cascading Effect of Enhanced Early Childhood Education and Development: A Life Course Perspective

- Ready for kindergarten
- Successful start in school
- Fewer behavioral problems
- More rewarding interpersonal relationships
- More successful learning
- Less tobacco and drug use
- Less delinquency and truancy
- Less juvenile justice encounters
- Higher high school graduation rates
- Higher rate of entrance to and completion of college
- Higher inventory and flexibility of job skills
- Better jobs
- More durable family life
- Higher income
- More upward social mobility
- Greater engagement in civic life

Better Health and Well-Being

One possible sequence of life events following early childhood experiences that are positive and developmentally promotive. Positive early childhood experiences not only have positive downstream consequences, but also may mitigate the influence of other negative factors as they occur later in life. Figure by Alvin R. Tarlov.

*Tarlov, A. R. "Cascading Effects of Enhanced Early Childhood Education and Development: A Life Course Perspective." Presentation for James A. Baker III Institute for Public Policy, Rice University, January 2004.

Achieving such positive results for children across their entire lives is unlikely unless thoughtful attention to their circumstances begins early. Young children are able and motivated to learn. Informed efforts by parents and teachers to build on that desire play a valuable role in providing children the proper foundations for school and life success. Daily surroundings also have a great impact on children's development and ultimately dictate how well they can lay those needed foundations. Jane Weichel, a past president of the National Association for the Education of Young Children, has identified the powerful influence of formative relationships, the critical role of communication, and the lasting relevance of early environments. "Young learners, given appropriate, meaningful, and interesting experiences and activities, are capable language learners, good problem solvers, and eager participants in offering their ideas."[2]

Despite the lack of a comprehensive early childhood development policy, the rapidly increasing knowledge regarding developmentally appropriate and particularly effective programs for early childhood has informed the movement toward proper early care and education for all children.[3] For example, recent advancements in the neuroscience of development, an understanding of social changes in the demand for child care, and relevant economic theory add depth to the arguments for early childhood education and development. Much evidence from these areas is so compelling that it has begun to provide momentum, via public awareness campaigns and strong advocacy, for early childhood education and development issues in both public and political arenas.

This document aims to provide a comprehensive and informative discussion of the

current status of, need for, and research-informed recommendations for early care and education. From the history of interventions that have worked to the description of effective teaching styles, this booklet addresses both the "whys" and the "hows" of early childhood education and development. The arguments for early childhood interventions compiled here make a compelling case that investments in the early period of life are as important as investments our society already routinely makes in primary education, post secondary education, and healthcare. This point is particularly powerful in light of the potential substantial and long-term economic gain for society from earlier involvement in children's development and education.[4] Furthermore, the detailed descriptions of ways to deliver developmentally appropriate care illustrate that such a task need not be as daunting as it might appear without awareness of established, efficient, and effective programs on which to draw.

Neuroscience Corroborates the Perception of Preschool Children as Capable Learners

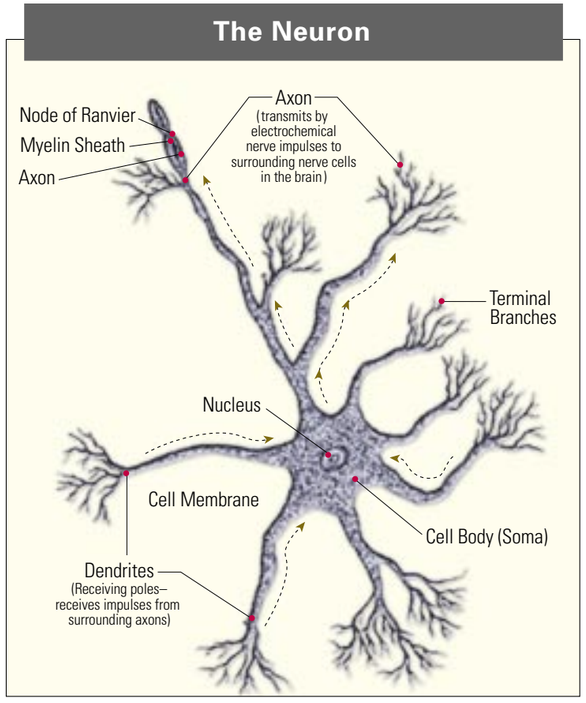


Figure 2*

Advances in the neuroscience of brain development have further accelerated interest and investments in the early years of life. As developmental neuroscientists achieve more detailed understandings of brain development, their findings more obviously corroborate the long-standing assertions of developmental psychologists and child development specialists: Children's learning and intellectual growth are profoundly affected by development in the early years. Scientific studies of the developing brain have clarified not only the lasting effects of brain development during the early years following birth but also the pathways through which physical brain development is quite susceptible to environmental influence, including early sources of stimulation from inside and/or outside the home.[5]

Both infant and adult brains contain about 100 billion neurons, or brain cells, yet an infant's brain weighs only one quarter that of an adult brain. This discrepancy in weight is largely attributed to the eventual development of a highly complex network of connections between the cells. This neural network allows each individual brain cell to respond in particular ways to other cells. While an adult brain contains a highly complex network of around 500 trillion connections, or synapses, an infant brain contains only 50 trillion such connections. Synapses are created as young individuals interact with the world around them. In the neurological equivalent of installing telephone

*Cicciarell, C. F. Figure 5.1, Research in Physical Education, Exercise, Sciences, and Sport. Scottsdale, AZ: Gorsuch Scarisbrick (1997). Reported at http://www.latech.edu/tech/education/cicciarella/hpe509/hpe_509/neuron.jpg.

The Impact of Environment on Neuron Development in Rats* †

In a stunning example of the effect of environment on the developing brain, Pat Levitt summarized several decades of research on the effect of laboratory rats' environments on the architecture of their brains. Particularly important in this work are the experiments of William Greenough at the University of Illinois Urbana–Champaign and his colleagues. Nearly all mammals undergo the "overproduction and pruning" process (described in the main text). "The loss of synapses [during pruning] is essential to the development of a functional … [brain] system; and survival and loss of synapses—as well as the operational quality of the system—depend on experience," Greenough states. Over the course of many studies with laboratory rats, he and others have shown that environments and experience change the very architecture of the brain itself by changing the number and quality of the synapses or connections made between neurons in the brain.

When Greenough compared the neurons of rats raised in "normal" laboratory settings (small individual cages with no stimulation) to those raised in social contexts (two rats in a cage) and those raised in enriched environments (~12 rats in a large living environment with a number of stimuli), it was found that the neurons of the rats in the enriched condition had 30 to 40 percent more dendrites than the rats in either of the other conditions, and there was evidence of a significant increase in the number of actual synapses. The enriched environment had created more connections in the brains of the rats as they were developing. Subsequently, these rats had the proper overabundance of synapses that allowed for pruning the brain for optimum functionality. And, perhaps even more importantly, those changes in dendritic formations—evident at one week of life in the rats—remained permanent into adulthood. As this research shows, environment and experience during development have a profound and lasting effect on the formation of brain architecture, which ultimately dictates how well a rat (or a person) will respond to challenges and learning opportunities throughout their lives.

*Levitt, P. "The Neuroscience of Child Development: Policy Implications." Presentation for James A. Baker III Institute for Public Policy, Rice University, January 2004.
†Benefiel-Kunkel, A. C., and Greenough, W. T. "Effects of Experience and Environment Upon the Developing and Mature Brain: Implications for Laboratory Animal Housing." *ILAR Journal* 39 (1998): 5-11.

wires, neurons "reach out to each other" to communicate experiences: Cells extend axons to deliver processed signals to other cells and proliferate dendrites to receive signals from other cells. The pattern of each child's neural network includes some connections dictated by genes, but brain development is far from predetestined entirely by genetics. Much of the "wiring" process depends on the activity and experiences of the infant, and later the child.[6]

Synapses allow the flow of chemicals that communicate information from one cell to the next. By age 3, the number of synapses reaches a peak of about one quadrillion, or twice that of the adult brain. This developmentally unique peak in available synapses makes the brains of preschool children more active, connected, and flexible than those of adults. Natural maturation involves a strategic strengthening of frequently used connections and corresponding deletion of unused or weaker connections.[7] Thus, the brain is modified to adapt to its environment. That is, experience directs neural connections and brain development.

Brain development's vulnerability to environmental influences reinforces that neither nurture nor nature alone can take full credit for a child's development. A stimulating environment—including reading, singing, talking, and playing with a young child—is essential to brain development. Conversely, a harmful or deprived environment—exposure to toxins, malnutrition, a lack of interaction with nurturing adults,

insufficient exposure to stimulating, challenging experiences, and lack of nurturing and supportive environments—can interfere with optimal brain development.[8] The influence of these experiences in the first years of life appears to be remarkably long-lasting.[9] Scientific evidence continues to mount in support of the argument that the quality of young children's environments predicts success in school and has a decisive impact on the rest of children's lives.[10]

Inadequate and inappropriate social and emotional experiences in the early environment support the acquisition of brain connections that match the demands of the child's early environment, but likely will be maladaptive or inadequate in the larger environment in which the child must eventually function. Countering such an effect requires creating environments adequately enriched to support optimal negotiation of critical developmental periods, early diagnosis of any existing problems, and prompt intervention with therapy after diagnosis.[11] Furthermore, bolstering the existing knowledge of child development with neuroscience translates into an enhanced opportunity to promote specific, documented venues of healthy development which will reduce risks in the early years of children's lives and prepare them to take advantage of all academic opportunities beginning in or before kindergarten.[12]

Social Changes Create Greater Demand for Child Care

National policy on the care and education of young children not only must keep up with the scientific realities of child development needs, but also must respond to the reality of cultural and economic trends. The demand for acceptable quality in preschool care and education has grown exponentially with the changes in society, such as the increased representation of women in the workforce, dual-income families, single parents, demographic change, economic challenges, etc. In 2000, the National Research Council and the Institute of Medicine sponsored the production of a major report titled, *From Neurons to Neighborhoods: The Science of Early Childhood Development.* This acclaimed book discusses a number of dramatic transformations in the social and economic circumstances under which families with young children live in the United States:

- Marked changes in the nature, schedule, and amount of work engaged in by parents of young children, and greater difficulty balancing workplace and family responsibilities for parents at all income levels;
- Continuing high levels of economic hardship among families despite overall increases in maternal education, and increased rates of parent employment;
- Increasing cultural diversity and the persistence of significant racial and ethnic disparities in health and developmental outcomes; and
- Growing numbers of young children, starting in infancy, who spend considerable time in child care settings of highly variable quality.[13]

Over the last half of the 20th century there were dramatic increases in the numbers of women who were working and had young children, with this group usually needing some form of alternative care for their children while they work. According to the Bureau of Labor Statistics, in 2000, 53 percent of married mothers with infants, 59 percent of unmarried mothers with infants, and more than 60 percent of mothers

with children under age 3 were in the labor force.[14] Most infants and toddlers of these employed mothers (73 percent) spent their days in nonparental care.[15] According to data from the National Center for Education Statistics, only 38 percent of children age 5 or younger receive care on a regular basis from parents. The other 62 percent receive care from relatives (15 percent) or friends (11 percent), in center-based programs (20 percent) or Head Start (3 percent), or in some other arrangement outside parental care (13 percent).[16]

There is disagreement among social scientists regarding the explanations for these employment and child care trends. Possible explanations offered include welfare receipt's recent contingence on work requirements, the failure of wages to keep up with rising costs (the lack of a "living wage"), maternal response to the less permanent nature of marriage, increases in women's career aspirations, and simple, modern materialism.[17]

Research indicates that parental monetary and time limitations are of primary importance in the choice of care, followed by concerns for quality.[18]

Child care plays a pivotal role in parents'—especially mothers'—efforts to prepare for and sustain employment. Some literature indicates that child care represents a powerful influence in parents' work situation. In particular, parents cite inability to arrange sufficient child care as a major cause of missed work days and inability to maintain employment.[19, 20] In addition, parents' workplace productivity declines when they do not feel secure in the child care arrangements they have made.[21] To ensure that parents keep their jobs, maintain productivity, and remain self-sufficient, they must have access to affordable, reliable, flexible, and safe child care. Quality child care is truly an effective component of workforce development strategy when it ensures that parents can afford care they believe will protect and promote the well-being of their children and that will accommodate their demanding and often nonstandard work schedules.[22]

In the next decade, if the American early education system doesn't do something dramatically different, 13 million more children will not realize their potential.[23]

Young Children Are the Poorest Members of Society

A study described by McCain and Mustard, commissioned by the government of Ontario, Canada, and published in 1999,[24] reports that modern socioeconomic conditions have an unfortunate potential to seriously threaten the institutions that most impact families of young children and their children's early development. Great variability in family structures and high demands on contemporary families increase the need for support of parents beyond traditional reliance on intergenerational knowledge and resources. Low-income children are particularly vulnerable to the detrimental effects of poor environments.

The percentage of U.S. children under 18 living in families whose income was below the official poverty threshold was 16.6 percent in 1999, or nearly 12 million chil-

dren.[25] Approximately 4 million of those children are under 6 years of age. An additional 12.6 million children under age 18 live in families whose income is 185 percent below the poverty line, a condition many experts consider deprived. Census and social work statistics show that young children are the poorest members of society and are more likely to be poor today than they were 25 years ago. Poverty in early childhood has long-lasting negative consequences for intelligence, cognitive and linguistic development, social and emotional maturation, achievement, and academic outcomes. For example, in research by Duncan and colleagues, families whose income doubled (averaged over time), from the poverty line had children who showed an increase of 3.6 points in IQ at age five.[26] Furthermore, the duration of the family's poverty experience is directly related to the degree of impact on the children's cognitive development. Children whose poverty experience persisted for at least four years averaged 9.1 fewer IQ points than children with no poverty experience, while children in poverty for one to three years averaged 4.0 fewer points.

Three-to-five-year-old children living in poverty are much less likely to have school readiness skills than children living above the poverty threshold.[27] In addition, children in poor neighborhoods are at greater risk for developing emotional and social difficulties, which may lead to a higher proportion of disciplinary problems in low-income neighborhoods.[28] Fortunately, early childhood education has the potential to greatly enhance the later success of poor children, but the issue of quality is paramount. Studied groups of disadvantaged children suggest this population not only gains the most from high quality care but also shows the most dramatic declines if they are in poor quality care.[29] This vulnerability is especially alarming given recent findings that curriculum and pedagogy in low-income preschools generally takes a limited view of children as active learners.[30]

A society that wants to have a highly competent population for the future to cope with the demands of the emerging knowledge-based world and global economy will have to ensure that all its children have the best stimulation and nourishment during the critical early years of development, regardless of family circumstances.[31]

Meeting the Need

According to the Caledon Institute of Social Policy, the "day care" label mistakenly implies that this institution's primary purpose is to allow parents to pursue gainful employment. While parents' workforce participation is an important factor, as discussed above, the proper primary function of child care is the provision of developmentally appropriate stimulation and socialization experiences that young children need. They note that children of the well-to-do and of stay-at-home parents can benefit from such an enriched environment as much as the children of the poor and of blue-collar workers.[32] Social trends demand more and better day care for working parents, but the demand remains unmet. For example, some programs, including Head Start, only span a half-day. Lack of full-day care presents a difficult logistical problem for parents who want or need to work full time. Such parents may be forced to choose child care settings that put minimal emphasis on education or development but that stay open during longer hours. Despite the lack of viable alternatives, such warehousing of children does not enhance their academic outcomes and thus fails to provide the needed foundation for a successful and productive citizenry.

The National Education Goals Panel recommends five dimensions that must be considered to maximize early development and learning:

1. physical well-being and motor development,
2. social and emotional development,
3. quality approaches toward learning,
4. language development, and
5. cognition and general knowledge.[33]

Addressing these dimensions is proposed to provide children with needed, helpful, and relevant early care and education experiences.

Adequate support of high-quality early childhood education requires leadership at all levels. Professional development is often a critical piece in the preparation of the leadership needed to advocate, defend, and implement the quality of early education that can promote school readiness as building a foundation for later academic and social competence. Elmore recently discussed current limitations in efforts to train and prepare educators, such as the isolation of teachers from others in the profession, lack of connection between academic administrative work and the content of teaching, and required coursework that is unrelated to and physically removed from actual daily work.[34] Proposed alternatives include performance-based accountability that, along with financial incentives tied to teacher performance, promises an actual strategy for investing in the skill of educators and reciprocally requiring higher accountability from these valuable professionals. Promoting school readiness in children includes not only the "readiness of the child," but the "readiness of the environments (including the people) that serve young children."[35]

Furthermore, meeting the need for early care and education will improve human asset development within society. Jacques van der Gaag and his colleagues in a World Bank publication (1998), have characterized early child development as constituting an essential foundation for social capital and equality, which he further identifies as imperative for economic stability and the reduction of poverty in both the developed and developing world.[36] And, appropriately, The Ford Foundation Series on Asset Building, published in 2000, is titled *Securing the Future: Investing in Children from Birth to College*. In this publication, the point is strongly made that:

> *Early child health and neurodevelopment remain the core of human asset development because what is formed in the brain is the basis for later functioning. This includes cognition (problem-solving), language and literacy skills, emotional regulation, curiosity, caring for others, creativity, and fine and gross motor skills. These important attributes, which derive from the critical early interaction between a child's experience and the developing brain, form the basis not only for a child's well-being (an important end in itself) but also for later adult productivity at work and social relations within the family and community… In this manner, early child health and development in general, and the developing brain in particular, can be viewed as a most critical economic asset.*[37]

Putting What We Know To Work

To effectively and efficiently promote optimal environments for early child development, society must pay careful attention to the scientific community's progress in understanding the most influential variables for this outcome. In particular, the specific factors influencing brain development, the neurobiological pathways that support behavioral tendencies and health, and the long-term effects of a poor early childhood, are areas of study that can helpfully inform efforts to improve the early, formative social and learning experiences of our children.[38]

The human newborn is now widely recognized as capable of learning at or even before birth, a developmental period long before children enter school. Because school is generally the first formal social institution in which children participate and perform, families should become involved in child development from early on as the primary social environment children experience before beginning school. We now have adequate knowledge regarding infants' capabilities and the environmental circumstances that best promote early growth and development to inform sound programs for enhancing children's development. As already described, it is obviously in a society's best interest to invest in the quality of early childhood as the level of this investment affects the future citizens, productivity, and prosperity of the society in which the children grow and develop.[39] The World Bank acknowledges this imperative idea in a recent report, saying, "Transforming this knowledge [of child development] into action is the major limiting factor in implementing early child development programs and requires the combined support of governments, nongovernment organizations, the private sector, and the media."[40]

Throughout the rest of this booklet, we hope to illustrate the ways in which we can begin to do precisely what the World Bank has suggested: turn knowledge into action. This comprehensive discussion of early child care and development presents the research and evidence needed to guide the structuring of young children's experiences (largely in organized settings). Specific means of putting this research and evidence into practice to maximize children's opportunities for optimal development and readiness for school are then delineated.

Definitions

In this discussion, the types of care we consider fall into several categories: for profit, nonsubsidized; for profit, subsidized; nonprofit (e.g., a YMCA day care); Head Start and Early Head Start; state preschool; and family or home-based settings, which can be subsidized. Many early care centers survive on the child care subsidy provided to parents in transition from welfare to work. Given the enormous variety of care venues referred to throughout the discussion, the following list of terms may be helpful. These have been described in Kaplan and Rigby (2003)[3].

early care and education—The entire system of care and education services provided to young children prior to school entry.
child care and education services—Provided for children from birth through kindergarten and usually full-day programs—primarily funded through federal child care and Head Start funds, federal Temporary Assistance for Needy Families (TANF funds), state funds, or parent fees for service.

preschool programs—Programs for 3- and 4-year-old children, regardless of funding stream.
child development programs—Care and education programs for infants and toddlers to age 3, regardless of funding stream.
prekindergarten—State funded preschool programs for 3- and 4-year-old children.
Head Start—Comprehensive child development program for preschool age children of poor families funded by the federal government or through state supplements to Head Start.
family child care—Child care that takes place in the home of a child care provider.
These various programs exist across the country without any coordination or universal standards for education and care.

Chapter II.
Efforts to Enhance Early Childhood Education and Development: History and Evidence

Research has established a clear and compelling connection between the quality of children's early learning experiences and later success in school and in life. Yet our children's years from birth to school entry receive less attention from policymakers—and lower levels of public investment—than any other stage in a child's journey toward adulthood.[41] Studies of programs and interventions that provide developmentally appropriate attention for children show that such programs can and do improve children's experiences and their chances for success later in life. This evidence provides a basis of support for early childhood interventions.

Maternal Care vs. High-Quality Child Care

In response to questions about the consequences of different child care arrangements in the U.S., the National Institute of Child Health and Human Development (NICHD) formed a team of researchers to design and implement a study of child care. Begun in 1991, the study aimed to address the relationship between child care arrangements and experiences and children's developmental outcomes. The Study of Early Child Care and Youth Development has followed a geographically, economically, and ethnically diverse sample of more than 1,300 children from birth to the present. The children and their families were measured on a number of different variables, from parenting practices to maternal vocabulary and children's social development to language mastery.

Data from the earliest phases of the study suggested that the amount of time a child spent in day care had no relationship to cognitive or language development. Instead, the evidence showed that overall quality of child care consistently (albeit modestly) predicted children's cognitive and language outcomes. Two measures of quality that were especially associated with cognitive and language outcomes for children were responsive, sensitive caregiving and frequency of language stimulation. Overall, there was a surprising similarity of experience and outcomes for children at home with their mothers compared to children cared for in high-quality center-based care arrangements. *In other words, child care provided outside the home was not inherently detrimental to children's educational outcomes.* The NICHD data showed that low-quality care certainly presented a disadvantage for children when compared to exclusive maternal care. On the other hand, however, high-quality center-based care arrangements were as good as, and even offered some advantages to maternal care alone, particularly on children's language scores at 24 months and verbal comprehension at 36 months.[42]

So long as children have high-quality care settings (with appropriate stimulation and nurturance), they show no evidence of deficits in their cognitive or language development as a result of receiving care outside the home. Importantly, the NICHD data showed that high-quality early childhood interventions can improve outcomes for children, even as compared to maternal care. Therefore, regardless of debates in the U.S. about child care vs. maternal care, the reality is that investments in high-quality early childhood environments will improve the development of American children.

Early Childhood Interventions That Work

While the NICHD study showed the value of high-quality child care arrangements, it did not identify any specific early childhood programs or curricula that succeeded,

nor can it, as yet, show the long-term impacts of child care on later life. Several recently published studies, however, have accomplished precisely that. The majority of literature on early childhood programs concludes that high-quality, particularly center-based, care settings can make an important difference in the lives of young children; evidence supports the widespread sentiment that early childhood programs can effectively prevent learning difficulties and promote healthy development. The most frequently cited examples, detailed below, illustrate that early childhood education programs have the potential to yield important benefits to children and to society.

The Chicago Child-Parent Center Preschool Program: A Large-Scale, Long-Term Success:[43] Chicago's Child-Parent Center (CPC) Preschool Program provides compelling evidence that large-scale, long-running programs can be effective. The program, which targets low-income minority children in high-poverty neighborhoods, offers half-day preschool for one to two years, full or part-day kindergarten, a parent education component, and integrates preschool, kindergarten, and elementary services. Started in 1967, CPC represents the second-oldest federal preschool program after Head Start and the longest-running extended early intervention. Distinctive features of the CPC program include an integrated, coordinated, and centrally administered system of early education spanning several years, high parent participation, and an emphasis on well-paid teachers and their ongoing professional development. Follow-up studies on the earliest students, some of whom are now in their 40s, show life-changing results (see By the Numbers, this page).

By the Numbers*

At age 21, participants in as few as 1 to 2 years of the CPC Preschool program had:†

- **Lower rates of school drop out (46.7 percent vs 55 percent),**
- **Higher number of years of completed education (10.6 vs 10.2),**
- **Lower rates of juvenile arrest (16.9 percent vs 25.1 percent),**
- **Lower rates of violent crime arrest (9.0 percent vs 15.3 percent), and**
- **Higher rates of high school completion (49.7 percent vs 38.5 percent).**

*Reynolds, A. J.; Temple, J. A.; Robetson, D. L.; and Mann, E. A. "Age 21 Cost-Benefit Analysis of the Title I Chicago Child–Parent Centers." *Educational Evaluation and Policy Analysis* 24 (2002): 267-303.
†In comparison to an "alternative preschool arrangement" control group; results adjusted for several covariates.

The stunning effects of the CPC program increase with the time a child spends in the program. Additional work has indicated the importance of the timing of the intervention—children who only participate in the preschool program fare better than those who only participate in the extended kindergarten and elementary school programs.[44] Data on children who participated in both programs indicates some additive effect, but the bulk of the positive influence of the program is derived from intervening during the preschool years. For instance, Reynold's data also shows that children who exhibited reading readiness, a preschool skill, more often later go to college, receive college degrees, and obtain skilled jobs, and generally achieve measures that reflect quite successful lives.[45] In contrast, the children from this sample who did not have reading readiness experienced much higher incidences of life limiting events,

such as dropping out of school, being incarcerated, and experiencing teen pregnancy. These negative outcomes are of a variety that creates an enormous financial burden on society as a whole.

The CPC provides strong evidence that established programs administered through public schools can enhance the long-term success of children from poor families.[46] Using federal Title I funds, the Chicago CPC has produced an effective program that improves children's lives.

The Abecedarian Project: Quality Child Care Works:[47] While Chicago CPC studies must rely on nonrandom assignment and quasi-experimental data, the North Carolina Abecedarian Project offers a look at evidence on early childhood interventions from a carefully controlled random assignment experiment. Between 1972 and 1977, 57 infants from low-income families received intensive, high-quality day care full time from as early as six weeks through age 3. For the first year of life, they received this care in their homes through home visitation; for two subsequent years, the intervention was administered in a preschool center. A comparison group of 54 untreated children were reared at home or in another child care setting. Under the project design, each child had individualized prescriptions of activities that addressed social, emotional, and educational (largely linguistic) development. Additionally, the program required teachers to have a bachelor's degree and compensated them at a level equivalent to that of public school teachers. With such a high-intensity program, the Abecedarian Project had profound positive effects on children. (See By the Numbers, this page.)

By the Numbers*

At age 21, participants in 5 years of the Abecedarian Preschool program had:†

- **Modest but significant increases in Full Scale and Verbal IQ (4.4 and 4.2 points higher, respectively),**
- **More years of completed education (12.2 vs 11.6),**
- **Higher rates of four-year college or university enrollment (36 percent vs 14 percent),**
- **More skilled jobs [Hollingshead rating greater than or equal to 4] (67 percent vs 41 percent), and**
- **Lower rates of teenaged parenthood (26 percent vs 45 percent).**

*Campbell, F. A., et al. "Early Childhood Education: Young Adult Outcomes from the Abecedarian Project." *Applied Developmental Science* 6, no. 1 (2002): 42-57.

While the intensity of the Abecedarian Project intervention is not necessarily realistic for large-scale programs, it illustrates the importance of children's early years. The large affect on child outcomes shows that early care does make a difference, even when controlling for family and home environment.

The High/Scope Perry Preschool Project: Quality Early Childhood Interventions Lead to Economic Gains:[48] Similar in scope to the Abecedarian Project, the High/Scope Perry Preschool Project in Ypsilanti, Michigan, followed a sample of 123 children, 58 of whom completed the experimental preschool program. Offered for low-income African American families, the project tracked the 58 participants and the 65 control chil-

dren through adulthood. In addition to the high-quality center-based child care and education, other distinctive features of this part-year program included lengthy weekly home visits to each family and a 10 percent pay increase for teachers above what local public schools offered.

One of the first studies to focus on the children's and families' economic status during follow-ups, the High/Scope Project showed substantial individual economic improvements for participants as compared to controls—in addition to the cognitive and school success gains. (See By the Numbers, this page.)

By the Numbers*

At age 27, participants in two years of the Ypsilanti High/Scope Perry Preschool Project had:†

- **Higher rates of high school completion (71 percent vs 54 percent),**
- **Higher likelihood of earning $2,000 or more per month(29 percent vs 7 percent),**
- **Lower incidence of welfare assistance as adults (59 percent vs 80 percent),**
- **Lower incidence of out-of-wedlock births (57 percent vs 83 percent), and**
- **Lower rates of repeated arrest [arrested five or more times] (7 percent vs 35 percent).**

*Schweinhart, L. J.; Barnes, H. V.; and Weikart, D. P. "Significant Benefits: The High/Scope Perry Preschool Study Through Age 27." *Monographs of the High/Scope Perry Educational Research Foundation* 10 (Ypsilanti: High/Scope Press) 2002.
†In comparison to a "no-preschool program" control group; results adjusted for several covariates.

While the High/Scope Perry Preschool Project only lasted from 1962 to 1967, it had a profound affect on the participating children's lives even several years down the road. By the typical measures of life success (home ownership, length of marriage, etc.), Perry Preschool participants fared much better than their nonprogram counterparts. This illustrates the powerful implication that effective early childhood interventions can significantly alter children's life-course trajectories into adulthood.

Head Start: Triumphs and Challenges: As the country's only wide-spread federally funded early childhood intervention for low-income families, Head Start occupies a challenging niche among early childhood programs. Unlike previously mentioned programs and experiments, Head Start attempts to make developmentally promotive services available to every very low-income child in the U.S. While Head Start has yet to serve every eligible child in the U.S., the program has made strides to bring the 850,000 children it does serve closer to school readiness.

In the recent past, Head Start focused largely on physical, social, and emotional factors of development and placed less emphasis on literacy and other cognitive skills. That has begun to change, but the implications are not well documented as Head Start outcomes data are limited and not always well controlled. Available numbers do not show meaningful gains in a number of cognitive areas, including prereading.[49] The minimal gains noted generally do not bring children up to the normative level for school readiness.

Recent federal government efforts to improve the literacy and language development aspects of the Head Start curriculum likely will help to improve outcomes for Head Start graduates on measures of school readiness. But in order to live up to its goal of getting disadvantaged children to the doors of the elementary school on a competitive level with their more advantaged peers, Head Start requires not only a more cognitive and linguistic focus but also increased use of standards and assessments to guide children's experiences.

Early Childhood: Worth the Investment

If you think education is expensive, try ignorance.

—Derek Bok

Investment in our young children's development can yield a high public return. In fact, the return on this investment has been described as "extraordinary, resulting in better working public schools, more educated workers, and less crime."[50] Early childhood interventions, like many other social programs, however, require adequate funding. *Despite the fact that state and local expenditures for child care now exceed $23 billion annually and federal expenditures have topped $17 billion, the need for child care remains unmet. In 2000, only one in seven families eligible for child care subsidies received assistance, and Head Start only serves about 60 percent of its eligible population.* States also fail to meet the need for quality child care and educational experiences.

The amount of funding needed to cover all unmet need may stagger both the mind and the pocketbook—but the alternatives are much more grim and much more expensive. According to some estimates, the national cost of failing to provide at least two years of early childhood education totals $100,000 for each child born into poverty—a cost of roughly $400 billion for all poor children currently under the age of 5.[51]

These estimates of "national cost" relate to the individual and social consequences of children left behind in the educational system. Economic studies of both the Chicago CPC and the High/Scope Project provide insight into how the benefits of early childhood education play out over the life course.[52,53] In fact, these studies estimate that *for every dollar spent on early childhood education and development programs, $7 to $8 are returned to individuals and to society.* Of the many possible categories of benefit, the most well-documented include higher individual incomes for participants, increased tax revenues, reduced school expenditures (due to reduced grade retention and special education), and reduced criminal justice expenditures. Keep in mind that not all possible benefits, such as improved health (reduced healthcare expenditures) or reduced welfare spending, for example, are accounted for, so

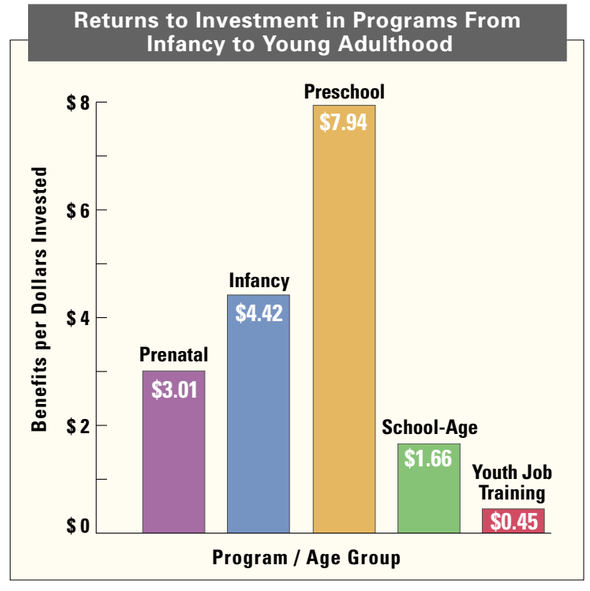


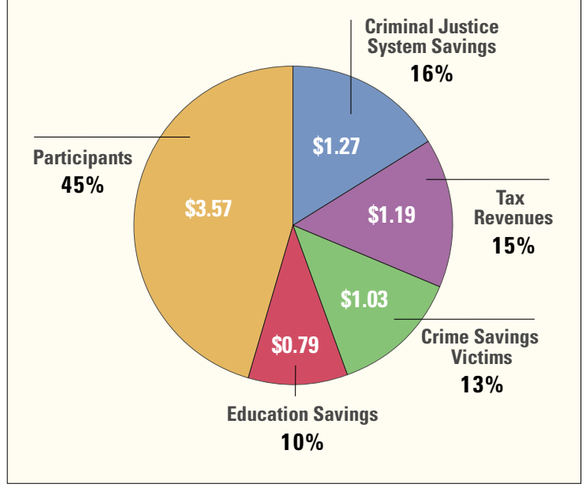
Figure 2

the $7 to $8 return likely is a conservative estimate.[52, 54] Additionally, benefits are calculated at age 21 of the participants, so the scope of benefits, such as increased earning potential and college attendance (many would not yet have graduated college), has not yet been fully realized.

Figure 2 illustrates the benefits to investing in early childhood education and development for preschool age (3 to 5 years) as compared to other possible interventions across the lifespan. In comparing the cost-benefit analyses of programs at different times, this graph powerfully illustrates that early childhood education and development programs have the greatest returns. Figure 3 illustrates how those returns are broken down into different categories—in other words, it shows where each part of the $7 to $8 return is realized.

Figure 3

Breakdown of Returns on Investment in Preschool Programs



Studies of the Chicago Child-Parent Centers reveal a return of $7.16 on every dollar invested in the program—45 percent of which directly benefits the participants through increases in income. An ability to take advantage of learning opportunities (by starting school ready and eager to learn) ultimately translates to higher graduation rates, college attendance, and better job prospects. A direct corollary to increased individual income is increased tax revenue. Of the $7.16 in benefits per dollar, the CPC study estimates that 15 percent of that goes back to the local, state, and federal governments through increased tax revenue. Not only do the individual participants and society at large benefit from investment in early childhood, but certain returns directly benefit the government. In other words, early childhood interventions have the potential to at least help pay for themselves in the long run through increased tax revenues.[55]

Furthermore, since participants in programs such as the Chicago CPC and the High/Scope Perry Project are less likely to utilize public assistance, the social and economic costs of welfare decrease. There is reason for speculation that these decreases in welfare costs may also represent a long-term decrease in the utilization of public assistance: Parents who graduated from preschool programs may later have both the resources and the necessary information to provide appropriate care for their children, thus (theoretically, at least) breaking the cycle of poverty and decreasing the incidence of dependence upon public assistance.

Participants in early childhood interventions also reap long- and short-term health benefits. More importantly, however, speculation about the potential for long-term

* Figures 2 and 3 adpated from Reynolds, A. J.; Temple, J. A.; Robertson, D. L.; and Mann, E. A. "Age 21 Cost-Benefit Analysis of the Title I Chicago Child–Parent Centers." *Educational Evaluation and Policy Analysis* 24 (2002): 267-303.

health benefits has greatly increased. While no studies have quantified this potential long-term benefit, Reynolds discusses it qualitatively.[52] Numerous studies have linked increased education level and increased income—both products of early childhood education programs—to increased use of primary care physicians and increased likelihood of having health insurance.[52, 54] It is appropriate to assume a significant increase in this kind of linked benefit—greater education and, subsequently, better long-term health—to participants of early childhood programs. Both individual and societal health benefits of early childhood education point to potentially large savings in medical expenditures over the long term as well as to increases in population well-being.

Additionally, the CPC study documents savings to the school system and to the criminal justice system that deserve mention. These savings result from a reduced need for remedial services and repeated grades in school and from a reduction in arrests. These reductions lead not only to reduced education system and court costs, but also to reduced costs to potential victims of crime. The effects of early childhood education on social costs are obvious and quantifiable. Educating our young children will minimize or prevent costly school, legal, and social failures. (See sidebar, this page).

"Let us reform our schools, and we will find little need of reforming our prisons."

— John Ruskin

Ruskin may not have had the statistical evidence to back him when he spoke these words, but recent analyses of long-term longitudinal data from both the High/Scope Perry Preschool Project and the Chicago Child–Parent Centers have suggested that Ruskin was right all along. Data from the High/Scope Project show statistically significant reductions in violent and nonviolent crime and in the rate of juvenile arrest. Perhaps even more importantly, Reynolds reports a 29 percent return per dollar invested in the Chicago Child–Parent Centers that is directly related to crime prevention. Returns to crime victims total 13 percent of the total return (or $1.03 for every $1 invested), while savings to the criminal justice system total 16 percent of the return (or $1.27 for every $1 invested).* By focusing on children early on, we may be able to stem the rise of antisocial behaviors that ultimately lead to crime.

We have begun to cross into a new pattern of relations between the older and younger generations and much depends on how well we understand what is happening, why, and what is to be done about it.† Youth violence—including not only rising levels of violence against others but also rising levels of violence against oneself (e.g., self-mutilation, eating disorders, and teen suicide)—is symptomatic of something much larger lurking beneath the surface. But research has begun to show that positive early childhood experiences can mitigate the factors that lead to adolescents' feelings of despair, apathy, diffuse anger, and depression—and that perhaps the cure we seek is not in prison reform, but in positive early childhood education and development experiences for all children.

* Reynolds, A. J.; Temple, J. A.; Robertson, D. L.; and Mann, E. A. "Age 21 Cost-Benefit Analysis of the Title I Chicago Child–Parent Centers." *Educational Evaluation and Policy Analysis* 24 (2002): 267-303.
† Orr, D. Political Economy and the Ecology of Childhood.

Obviously, the individual, economic, and societal benefits to investing in early childhood add up to a better educated, healthier, and better socialized population. This leads to another benefit of early childhood education: A better educated, better

socialized, and healthier population also is a better educated, better socialized, and healthier workforce. In the short term, when parents feel comfortable about their children's well-being, they become more reliable and productive employees.[56] In fact, numerous labor studies indicate that low-income women's high job turnover rates most often directly relate to child care problems or difficulties.[57, 58] The availability of high-quality, accessible child care could save industry millions each year in lost work days because of inadequate care arrangements. Further down the line, children who've had exposure to early childhood programs need less remedial help on the job as adults, and, therefore, create efficient and improved economic returns for companies. The potential for early childhood education to present American companies with a more flexible, skilled, learned, and prepared workforce has important implications for U.S. business vitality.

Very few would argue, in the face of so much evidence, that early childhood education and development investments reap substantial economic and societal returns. Nonetheless, recent research takes the claim even one step further. Authors such as Heckman and Duncan use human capital theory to argue that early childhood represents the best and most economically efficient period of life for such investments.

According to economic analysis and theory, early childhood interventions are both more effective and more cost-efficient than any other youth-centered intervention (through young adulthood).[59, 60] Interventions for at-risk adolescents, for instance, have a high failure rate and a low return on investment. Unfortunately, it is difficult to entice policy makers to increase funding for early childhood programs at the expense of decreasing funding for programs that address at-risk teens, crime, and other "social cancers."

Figure 4

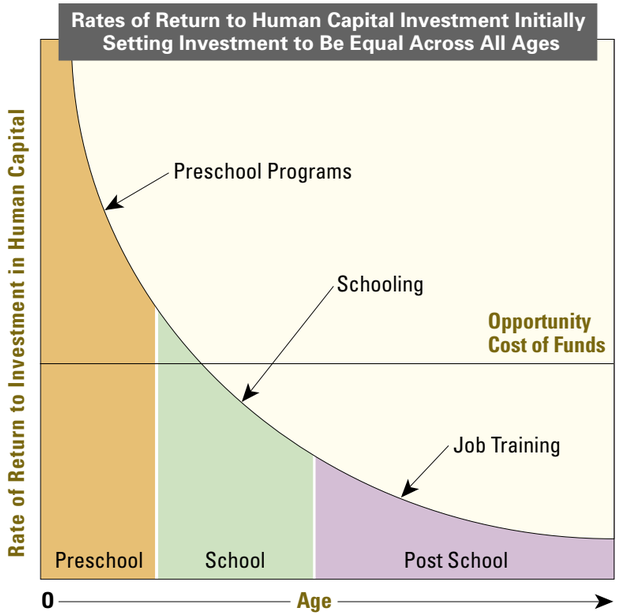


Figure 4: This grap
evident that
capital development theory.

*Carneiro, P., and Heckman, J. "Human Capital Policy." Working paper no. 9495, National Bureau for Economic Research, 2003 (www.nber.org/papers/w9495).

Interventions in early childhood, however, can be thought of as preventive measures for precisely those issues that plague American society today—preventing poor health, criminal behavior, at-risk adolescence, poverty, illiteracy, and school failures before they even occur. Armed with this outlook on early childhood, we must act to take advantage of the most influential period of growth in a child's life. There is now more than enough evidence regarding early childhood interventions' cost-effectiveness and potential gains in human, health, and social capital across the lifespan. When this opportunity to positively affect children's life course trajectories is neglected, the loss is felt not only by the children but eventually by the whole of the society in which they live.

Chapter III.
Healthy Kids, Learning Kids: The Interplay of Health and Education Across the Lifespan

Research continues to suggest that a very close, complex, and interdependent relationship exists between education and health.[61] This relationship has implications across development, with early childhood setting the direction for the "life trajectory" of how education and health will interface for a given individual. Simply stated, a healthy child learns more effectively and has better academic outcomes than other less healthy children, and a child who does well in school—even in the presence of early childhood health problems—and attains higher levels of education ultimately will experience better adult health later in life.[62]

This interdependency of health and education means that both healthcare providers and educators are well advised to attend to the area of the other. To obtain cognitive, emotional, and academic goals, high-quality early childcare and education programs must attend to the health of the children they serve. Educators cannot afford to ignore the fact that monitoring young children's health and physical well-being will lead not only to increased health over the life course but also to increased school success. Equally important, physicians who neglect children's cognitive, linguistic, and socioemotional development will be less likely to see their patients sustain healthy and productive lives as they mature.

When discussing programs related to the earliest years of life, a child's health needs obviously must be met before they can fully take advantage of educational opportunities. Hunger and illness interfere with concentration and memory just as visual impairment interferes with recognition of letters or numbers and hearing impairment interferes with speech. The basic hierarchy of human needs dictates that the immediate physical needs of a child must be met before that child can benefit from instruction. In a logical extension of this idea, young children's health has a great impact on their eventual readiness for school in terms of their level of physical, social, and cognitive development. Certain areas of early childhood health raise special concern in relation to children's readiness for school. Among the most important of these is appropriate physician attention to development, nutrition, stress, chronic disease, and mental health.

Programs for early childhood education and development must acknowledge that a child's ability to take full advantage of learning opportunities early in life has an impact on health later in life. Research shows that educational attainment and related financial stability is related to health outcomes, including occurrence of heart disease, diabetes, and a host of other chronic adult health problems.[63, 64] Individuals with higher educational attainment not only live longer but have a shorter duration of disability before death as compared to individuals with lower educational attainment.[65] Furthermore, Davey Smith and colleagues documented that socioeconomic status in childhood, regardless of status in adulthood, predicted adult mortality from stroke, stomach cancer, and coronary heart disease.[66, 67] Early health and development, and subsequently, early learning, ultimately will lead to improved adult health on a variety of measures.

This chapter serves to illustrate the synergistic and interdependent nature of health and education. Focusing on one without the other ultimately undermines both in any serious effort to serve young children.

Developmentally Appropriate Early Pediatric Care Improves School Readiness

In his book, *Health for All Children,* David Hall lists the main tasks of child health promotion as:

- Emotional support,
- Prevention and detection of disorders and health problems, and
- Practical help.[63]

Hall's recommendation is that services offered to children by their physicians and pediatricians should include and focus on these tasks. Pediatricians and early childhood caregivers shoulder enormous responsibility to children and, consequently, to society at large to promote optimal environments for children in their earliest years. Given the weight of this responsibility, proper incentives should be in place to ensure that insurance companies recognize developmentally supportive practices as medically necessary and worthy of reimbursement. Professionals are less likely to spend time with patients emphasizing school readiness if reimbursing agencies discount this activity.

Certainly the detection of physical disorders and health problems is already well established as a focus of pediatricians and family practitioners. However, as patient volume increases and length of face-to-face patient time dwindles, medical care is becoming an increasingly less likely source for providing emotional support or practical help, particularly in developmental guidance. Physicians and nurse practitioners who see young children can improve on the Hall health tasks by attending to the developmental domains of school readiness:

- Physical and motor development,
- Cognitive development,
- Language development, and
- Social and emotional development.

From very early in a child's life, progress in these domains affects later readiness for and success in school and across development. Thus, attention to these domains gives physicians working with young children and their families the potential not only to provide parents and caregivers the much-needed emotional support and practical help they need on an immediate basis but they also will have an opportunity for preventative action in child health for the long term. This potential role in prevention is what would give medical professionals the opportunity to improve children's outcomes as diverse as the development of chronic adult disease and degree of academic achievement.

Because children's health and school readiness influence consequences into adulthood, physicians and nurses in pediatrics and family medicine cannot avoid a certain responsibility to children and to society to promote developmentally appropriate care. Social policy has begun to shift, reflecting an understanding of the importance of early childhood development for a myriad of life outcomes. The family physician is often the only professional with health and development training to have personal contact with families who have children under school age. As a result, pediatricians and other family practitioners have increasingly been called on to direct attention to, and take an important role in, identifying developmental disabilities, instituting appropriate

Reach Out and Read

"Doctors use the words 'early detection' when they talk about curing sickness. Early detection is vital to the treatment and cure of another problem…illiteracy, which affects thousands of Texans. Fortunately, this problem is 100 percent curable in its earliest stages…through a treatment called reading."

*— First Lady Laura Bush**

Creating a program that would encourage parents and children alike to read was as simple as asking doctors to write a prescription, child developmentalists have discovered. Started in 1989 at Boston City Hospital, the Reach Out and Read program bridges the gap between the fields of medicine and education. The program combines three interventions to encourage early reading in families:
• Doctors write a "prescription" for daily reading for young children (between six months and school age), and nurses and doctors encourage reading aloud and provide tips for developmentally appropriate activities.
• Doctors and nurse practitioners provide new developmentally appropriate books for children to take home and keep.
• Doctors, nurses, and waiting room volunteers model developmentally appropriate techniques for reading to young children.

Now implemented in more than 1,100 clinics nationwide (with 145 and growing in Texas),† the program offers a simple and profound vaccination against illiteracy. This highly effective preventative measure has received much acclaim through recently published literature that points to its success at improving children's early literacy (as assessed by vocabulary tests and other standardized measures).††§# Reach Out and Read also improves parent's attitudes toward reading aloud to their children; subsequently, parents are more likely to read more often and provide more books in the home.**

More importantly perhaps, Reach Out and Read helps to mitigate the long-term effects of illiteracy and educational difficulty by intervening early. Reading difficulties are indicated in school failures, which predict later struggles in life, including school delinquency, high school drop-out, teenage pregnancy, substance abuse, and poor health outcomes. An early vaccination against illiteracy will have lasting positive effects on each young child's lifecourse trajectory, stemming the cycle of poverty and dependence many low-income children otherwise face.

* Cooley, S. Reach Out and Read Texas pamphlet. The Center for Improving the Readiness of Children for Learning and Education (CIRCLE) at The University of Texas Health Science Center at Houston.
† Cooley, S. Reach Out and Read Texas information sheet: "Program Growth Since ROR-TX Initiative Began." The University of Texas Health Science Center at Houston, January 2004.
†† High, P., et al. "Literacy Promotion in Primary Care Pediatrics: Can We Make a Difference?" *Pediatrics* 104 (2000): 927-934.
§ Mendelsohn, A., et al. "The Impact of a Clinic-Based Literacy Intervention on Language Development in Inner-City Preschool Children. *Pediatrics* 107 (2001): 130-134.
# Sharif, I.; Reiber, S.; and Ozuah, P. O. "Exposure to Reach Out and Read and Vocabulary Outcomes in Inner-City Preschoolers." *Journal of the National Medical Association* 94 (2002): 171-177.

and timely interventions, promoting optimal development, and enhancing the school readiness of all children.

One response to this call has been the introduction of child development as a certified subspecialty of pediatrics, with residency programs in child development that have specific training requirements. Other responses include programs and interventions

that help physicians, nurses, parents, and caregivers provide developmentally appropriate care for young children.

Programs like Reach Out and Read have begun to connect pediatricians and family practitioners with concepts and practices of school readiness. This provider-based strategy includes a written prescription for parents to read to their children, contributes appropriate literacy advice, models book sharing, and engages physicians in giving books to children and their parents. This low-tech, inexpensive intervention is proving highly effective. Research following families in the program shows that low-income two-year-olds experienced a gain of nearly six months in language development, an improvement that has the potential to significantly increase a child's school readiness.[64]

The mere ability of such a program to increase physicians' awareness of their own potential and responsibility to improve children's educational outcomes is highly valuable. Putting Reach Out and Read and other programs in place further provides physicians with access to knowledge and resources that facilitates their ability to provide developmentally appropriate care. As pediatricians, family practitioners, and other medical professionals develop even greater skill at providing these services, children's developmental progress, health, and, subsequently, school readiness, will improve. However, while developmentally appropriate care at the clinic is hugely important, so, too, is the transfer of knowledge from medical professional to parent. As professionals who care for our children become experts at guiding parents, the primary caregivers, to care for the multiple, daily needs of their children, the well being of the nation's children will improve on a number of measures.

Good Nutrition: A Driver For Physical, Socioemotional, and Cognitive Development

A child's cognitive, social, and physical development depends heavily on the degree to which their diet includes appropriate amounts of nutrients and calories. American families across the board do not suffer from malnutrition—i.e. lack of sufficient food—but more often from misnourishment—i.e. an overabundance of foods high in fats and calories but low in substantive nutritional value.[68] For example, families of all income levels in the U.S. find themselves relying excessively on fast food, which is a challenging venue in which to provide children with proper nutrients since fat constitutes 45 percent to 55 percent of most fast food menu items' caloric content.[69] While actual developmental delays do not develop until lack of proper nutrients becomes severe, the diet of many American children does not provide an especially ideal foundation for physical and cognitive growth and development.

A decline in physical exercise among children compounds the diet issue. Recent studies suggest that the average child now watches at least three to five hours of television per day, a rate comparable to obese adult males who reportedly watch about three hours of television per day.[70] Unfortunately, other studies also show that pubertal and postpubertal children currently spend only eight to 10 minutes per day in aerobic activity.[71] Furthermore, a recent longitudinal study revealed sharp declines in activity rates, particularly for girls, across a 10 year period.[72] This lack of physical activity and resulting obesity can complicate healthy physical development.

In addition, the medical community has greatly increased efforts to warn the public of significant, chronic diseases for which obesity is a major contributing factor. Diabetes[73] and early signs of heart disease[74] are reportedly being seen at young ages previously unheard of for such health complications, and up to 94 percent of obese children also experience a sleep disorder, typically sleep apnea (Mallory et al., 1989; Marcus et al., 1999).[75, 76] Furthermore, obstructive sleep apnea in obese children has been associated with clinically significant deficits in learning and memory relative to obese children without sleep apnea (Rhodes et al, 1995).[77] Health problems caused or complicated by obesity can interfere with learning by leading to more health-related absences from school, limiting children's activity, and disrupting learning processes.

More traditional nutrient deprivation continues to have serious consequences as well. Physical maturity in children relates to cognitive advantages over same-age peers whose physical development lags as a result of calorie deficits, a relationship that holds even when controlling for socioeconomic differences.[78] Additionally, studies of infants, toddlers, preschoolers, and school-age children consistently reveal a small but significant correlation between height-for-age and a variety of cognitive and social competencies.[79, 80] That is, in addition to problems related to obesity, children who are sufficiently undernourished to experience delays in physical growth also are at risk in terms of cognitive development.

In addition to cognitive and academic problems, maladaptive patterns in nutrition and physical activity often bear social and/or emotional consequences for children whose patterns are persistent enough to effect their physical growth. Children on the obese end of the spectrum often experience teasing and can become stigmatized as a result of social response to their weight status. For example, children rate drawings of obese classmates as the least desirable playmates when asked to evaluate drawings of various-sized children.[69] These kinds of social experiences may lead to the fairly consistent report that obese children and adolescents are more likely to develop a negative body image, which can lead to low self-esteem in some children, particularly girls.[81, 82] Studies based on the general population and those from clinically referred samples also find that parents and teachers report more behavior problems (not necessarily disorders) in obese children and adolescents as compared to their nonobese peers.[83, 84] Thus, obesity may put children at risk not only for personally troubling emotional difficulties, but also for socially disruptive behavior problems.

Children whose physical development is effected by undernourishment may experience social and emotional consequences as well. For instance, a longitudinal study by Chavez, Martinez, and Yashine found that infants in an impoverished rural Mexican neighborhood who were given nutrition supplements starting at birth received more physical, verbal, and emotional stimulation and attention than a comparison group of infants from the same community who did not take the supplements.[85] Thus, particularly in less-developed societies or families where infant neglect is occurring, reduced activity and malnourishment may alter the child's interactions with caregivers. That is, if an undernourished child behaves less socially or develops anxious or apathetic tendencies, caregivers may not as frequently or supportively engage him or her. There is, however, a complicated relation between maternal caregiving behaviors and nutritional deficits, as demonstrated in a study by Valenzuela in urban, poor Santiago, Chile.[86] Her study, which found relationships between maternal sensitivity and child nutritional status, attachment security, and mastery behavior, also found relations between maternal sensitivity and maternal education, maternal weight, and marital satisfaction.

That is, while mothers who were more sensitive tended to have more well-nourished and securely attached children, this quality of sensitivity also was more likely to be exhibited by mothers with higher levels of education, adequate nutrition for themselves, and supportive marriages. In a population with major challenges to obtaining adequate nutrition for young children, a complicated cycle may exist between nutritional status, caregiver responsiveness, and child outcomes. In addition to consequences to the child's relationship with the primary caregiver, other adults involved in the child's development (teachers, physicians, etc.) may treat children with physiological lags, which can result from chronic caloric deficits, as younger than their peers simply because they look younger.[87]

Quality of nutrition and related physical growth can thus affect a child's school readiness, and not only by virtue of the biological consequences of improper nutrition. Early school readiness also can suffer when nutrition suffers because of poor nourishment's effect on and relationship to cognitive, social, and emotional development. Addressing nutritional issues in children requires attention to many socioeconomic and social factors because these factors often are associated with both undernourishment and obesity.

The fact that a lack of family resources might result in malnourished children (lack of food) is hardly surprising given that purchasing food for young children and/or nursing mothers requires family resources. The Valenzuela study cited above further implies that, across an impoverished sample, differences in maternal education, for example, still can uniquely predict maternal sensitivity, which consequently can predict child nutritional status within that impoverished sample. That is, for severely impoverished populations, components of socioeconomic status can have cascading effects for children's nutritional deprivation, related deficits in physical growth, and subsequent potential to solicit needed verbal, social, and emotional stimulation from caregivers.

Even obesity, however, has been associated with low socioeconomic status (SES) in the United States, a relatively wealthy nation. A recent study by Goodman, Slap, and Huang (2003) examined the relation of specific components of SES to obesity outcomes and found that the population attributable risk (PAR) for income was 32 percent and the PAR for education was 39 percent.[88] Thus, both income level and education level, but especially education level, were related to obesity outcomes. Furthermore, social factors such as neglect and a generally hostile home environment appear to be associated with obesity.[89] Reports suggest that the risk of obesity is nine times higher for neglected children,[90] while clinical populations of adults seeking treatment for obesity report four times more childhood sexual abuse and two times more nonsexual abuse than adults from a control population.[91] Thus, a family's SES and their relative risk status for abuse and neglect are important considerations in children's risk of improper nutrition and related risk for obesity.

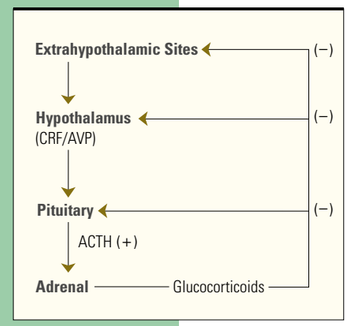
Proper nutrition (highly nutritive caloric intake), coupled with meaningful physical activity, may increase the school readiness of young children. Reciprocally, positive experiences in early education programs may ameliorate risk factors for obesity and/or undernourishment for children living in families with high SES or social risk factors for these problems in nutrition. That is, enhancing children's educational trajectories at early ages is likely to have positive consequences for the trajectories of their physical health trajectories and outcomes. Even when families are unable to model high quality eating habits or provide adequate emotional and cognitive stimulation at home, a child who at least receives these influences in early, structured caregiving and/or school environments has an exponentially improved potential for better health and education outcomes. Attention and care must be given to these topics in patient/parent education, school food programs, and the development of early childhood programs that will be sensitive to the real needs of modern children. Providing children with the right fuel for their bodies and minds from the onset will allow them to take full advantage of their developmental opportunities.

Stress and Children's Development

The human body responds to environmental, emotional, and social stressors with a form of "heightened alertness" produced by a biological response that prepares the body for a defensive response (i.e., the "flight or fight" response). This response is initiated by the release of Corticotropin Releasing Factor in the brain, which, in turn, signals for the release of glucocorticoids, a hormone called cortisol in humans, by the adrenal glands, which are located on top of the kidneys. Cortisol affects every major

The Endocrinology of the Stress Response*

Any time a person experiences a stress event that lasts longer than a few minutes, the body responds by elevating the amount of cortisol in the bloodstream. The paraventricular nucleus (PVN) of the hypothalamus, a small area of the brain, controls cortisol levels by regulating the production and release of cortico-tropin-releasing hormone or factor (CRH/CRF) in response to stress events. In a cascading sequence of events, CRH acts on the pituitary gland (situated within the brain), causing it to release adrenocorticotrophic hormone (ACTH) into the bloodstream. Once the ACTH reaches the adrenal cortex (located atop the kidneys), it stimulates the adrenal cortex to release cortisol (glucocorticoids). While both CRH and ACTH are released in short bursts, these brief spikes in hormone levels cause a sustained release of cortisol from the adrenal cortex that lasts about 15 minutes. Each release of cortisol has a half-life in the blood of 100 minutes, meaning that each sustained cortisol release will affect the body for at least one-and-a-half hours, but often longer.



This cascading sequence of events occurs in a system known as the hypothalamic-pituitary-adrenal axis (or HPA axis). Cortisol release is regulated by both positive and negative feedback that occurs at various points along the system. Positive feedback induces further release of cortisol, whereas negative feedback, which is more common in the HPA axis, reduces the activity of the HPA axis. As cortisol concentration in the blood increases, the hypothalamus and other portions of the HPA axis respond by reducing their respective hormone production. This system should work to maintain cortisol levels within certain bounds according to the body's needs and stressors. Chronic stress and elevation of cortisol levels, however, reduces the HPA axis' responsiveness. In other words, the negative feedback receptors in the HPA axis that would normally cause a decrease in CRH and ACTH start to "ignore" the cortisol concentration in the blood, and continue to produce CRH and ACTH. As the negative feedback system begins to fail, cortisol levels stay elevated for much longer than normal, ultimately causing detrimental effects among the body's organ systems, including the brain.

* Jameson, D. W. *Mind–Body Health and Stress Tolerance.* New York, NY: Universe Inc. (2003): 6. Reported at www.mind-body-health.net.

organ system. The body's detection of higher cortisol levels produced in response to a stressor biologically (and potentially psychologically) prepares a person to respond to stress and maintains that level of readiness until the threat or stress has passed.

Circadian rhythms of cortisol production are not identifiable at birth, but begin to emerge by about three months of age.[92] These natural, daily changes in cortisol production help maintain normal biological homeostasis and do not necessarily reflect particular stresses or a problematic pattern. Temporary increased cortisol production in response to stress also can have positive effects for an individual, allowing appropriate response to various situations and providing particular biological systems with the necessary support for that response. When stress persists, however, and cortisol levels remain elevated for prolonged periods, a detrimental situation arises for the neuroendocrine system and for the rest of the body.

In early childhood, the detrimental effects of chronically high levels of cortisol may increase the risk for developmental problems or delays. For example, the hippocampus, a part of the brain important for learning and memory, has a very high concentration of glucocorticoid receptors and is adversely affected by elevated cortisol levels.[93] This vulnerability of the hippocampus to high cortisol levels may be why research has found associations of cortisol levels with diminished learning and memory capacity.[94] Another example comes from the cingulated gyrus, which also has numerous receptors for cortisol and appears to support effortful attention and the ability to inhibit a prepotent response. When glucocorticoids are artificially elevated in experiments, college-age students have demonstrated impaired selective attention relative to the amount of hydrocortisone administered.[95] In addition, children with asthma who must use corticoid inhalants exhibit impaired attention regulation and self-control following usage, and a study has found that preschoolers whose parents and teachers identify them as having the poorest "effortful control," also have daily cortisol levels in the top third of the study's sample distribution.[96]

For young children, the impact of child care settings on cortisol can be of particular concern. Observations of children cared for outside the home reveal increased levels of stress throughout the day when compared to children cared for by the parents at home. A high-quality child care setting, however, can mitigate the rise in stress, allowing for a supportive biological response to social and cognitive challenges. Specifically, studies show that infants left with an unfamiliar caregiver who is friendly, playful, and sensitive did not show significant increases in cortisol, whereas those left with an unfamiliar babysitter who was cold and distant did show such increases.[97] The quality of the early, primary caregiving relationship (i.e., that with parents and particularly mothers) also appears to play a role in how young children's neuroendocrine systems respond to stress. Research shows that a secure attachment to an involved, primary caregiver buffers the cortisol response to stress events in young children.[98, 99]

Neuroendocrinology and child development intersect in early childhood stress research—an intersection that holds potential for shedding light on the relationship of biological and socioenvironmental factors to the healthy development of young children. In the meantime, high-quality early childhood care and education settings will help to decrease the detrimental effects of stress and related neuroendocrine responses on children's capacity for cognitive and socioemotional growth.

Mental Health

Related to neuroendocrinology and stress is the issue of children's mental health. Hormonal irregularities of many kinds can cause changes in the structure of the brain that undermine a child's development, altering anything and everything from his or her ability to learn to his or her ability to regulate emotions. Relatedly, mental disorders—from depression to attention-deficit hyperactivity disorder—can affect children at very young ages, sometimes as young as 2 years of age.

Responding to children's mental health needs with a constellation of appropriate services can ultimately result in improved care for each child and a less-disruptive educational environment for the classrooms in which those children eventually will be taught. Children's mental disorders pose enormous challenges and much frustration for parents, teachers, and young children alike. Reducing this burden requires a carefully considered, optimal mix of general, targeted, and clinical interventions.[100] A tiered system of effective universal screenings, followed by targeted group interventions, and finally, individualized clinical care when needed will help children to obtain appropriate care by identifying affected or at-risk children early. Such a hierarchical system also will maximize clinical service time by facilitating clinical service for those patients who require clinical help, while providing (less-intensive) alternative care for other patients who require attention but not necessarily individualized, targeted clinical care.

Mental health constitutes a powerful influence on a child's ability to function in almost any setting, particularly in any social context. Given this influential role of mental health, school readiness varies in relation to the ability of early childhood caregivers to recognize and seek appropriate treatment for mental health issues in their early stages. Even when early childhood caregivers develop these skills, access to and provision of appropriate patient/parent education and care regarding mental health issues must follow in order for benefits of mental health awareness to reach the children.

Early Health—A Lifelong Impact

Children's health, including nutrition, physical development, chronic illness, stress, and mental health, profoundly affects their school readiness. Across time, the converse also is true: A child's school readiness—and, subsequently, success in school—is a significant predictor of adult chronic diseases. As reviewed above, children's exposure to either beneficial or detrimental circumstances during their early years helps to set a life-course trajectory. This projection of life outcomes manifests as tendencies toward different expressions of health and well-being predicted by related early experiences. Only recently have public health institutions begun to realize the importance of early childhood exposures in the development of this life-course trajectory. Many of the illnesses and disabilities and associated lifestyle and behavior patterns that emerge in adult life have their roots in early life, including even the fetal period.[101]

Positive experiences in early childhood, such as exposure to appropriate education and developmental practices, strongly influences the degree of later successes in literacy and numeracy—two important skills for an individual's socioeconomic trajec-

tory. Socioeconomic status has well-established ties to health status later in life. Furthermore, enhancing the quality of early childhood care and education and its related individual gains in health over the life-course can extend to subsequent generations. For example, a nutrition program for preschool-age children may help to reduce the later incidence of low birth weight among mothers who were program beneficiaries as children. In providing children with a proper early exposure, this particular kind of intervention has the potential to break the cycle of intergenerational transmission of low birth weight.[102]

Evidence of long-term gains for early childhood interventions has grown, and this evidence should drive a movement toward focusing on early intervention. With such a long timeframe over which to reap the benefits, programs in child development offer a large return in both the long and short term. Not only do children's immediate health and educational outcomes improve but their potential for better health, well-being, and life success in adulthood increases. Subsequently, the environments to which they expose their children improve, leading to sustainable improvements in human well-being.[103]

Given such powerful evidence of both the long- and short-term health impacts of experiences in early childhood, it seems clear that high-quality early childhood education programs would benefit from linking children to appropriate health services. Not only will helping children to remain healthy help them to achieve school readiness but helping them to succeed in school also will improve health later in life. The bidirectional relation between health and education throughout the life course are so powerful that we cannot afford to overlook them when preparing our children for school entry and for life success.

Chapter IV.
Developmental Domains: Intertwined and Linked in Children's Growth

Rather than consider cognition and emotion as distinct domains…it is that cognition and emotion are part of the whole.[104]

For some time, supporters of early childhood interventions have debated about the appropriate level of focus on academics at the preschool level. Contention surrounding this issue centers around the amount of emphasis that should be placed on cognitive issues relative to negotiating the hurdles of early social and emotional development. Those in each camp worry that an overemphasis on one area will compromise development in the others. For example, opponents of academics in preschool fear that rigorous academic exposure may hurry or stress a child at the expense of emotional health or social development. Proponents of academics in preschool worry that an overemphasis on socioemotional development will leave children unprepared for school. However, research indicates that children's primary developmental domains—physical, social/emotional, and cognitive—have such complex interrelations that developmentally appropriate practices should no longer take an "either/or" focus. On the contrary, developmentally appropriate practices give adequate attention to all the primary areas of early development, adjusting emphasis to fit a child's developmental status.[105]

Increasingly, experts in human development and education have come to recognize that physical, social/emotional, and cognitive elements of early childhood are inextricably interrelated facets of development.[106] These facets often are referred to as "developmental domains," and cumulatively constitute the construct of school readiness. That is, school readiness requires solid development in not only the cognitive domain but in all the major developmental domains. In fact, socioemotional development and academic learning have a far more complex, interrelated relation than was previously understood. School readiness is a product of all the environments in which children learn and grow—families, early child care settings, schools, neighborhoods, and communities. The belief that social skills benefit from cognitive development is strongly supported by growing evidence of pervasive cognitive influences on social skills and the power of interplay between cognitive stimulation and social engagement to produce compelling transformations.

Interdependent, multidirectional relations exist among the developmental domains—physical, socioemotional, and cognitive. These synergistic relations imply not only that mastery in one domain enhances development in the others but also that problems in one area can delay or indefinitely postpone development in other areas. An example from the area of early motor developments includes infants' first success at crawling and walking. Once acquired, a new ability to move at will greatly increases the kinds of experiences infants can have, which then affects their cognitive development, their sense of themselves as active and mobile agents, and their perspective on the world around them.[107] In another example, a complex cycle of developmental interactions emerges as children's ability to use language influences their ability to establish social relationships, which, in turn, leads to differences in social skills that support or impede further language development. Understanding the implications of the meaningful links among developmental domains is essential for high-quality early learning and development.

Physical/Motor Development

Learning is inextricably tied up in action—even simply performing motor skills actually alters brain function.[108]

Esther Thelen, a well-known professor of psychology and cognitive science, calls the developmental relationships "an inextricable causal web of perception, action, and cognition" in which "knowing develops from doing."[109] Her implication is that the ability to "do," and thus to learn, relates directly to mobility and motor skills. In fact, the motor developmental domain influences many aspects of children's success in cognitive, perceptual, and social development that casual observers might not consider.

As early as 1950, Piaget's theory of intelligence proposed that representational thought develops from overt activities with objects during infancy.[110, 111] Since then, numerous infant studies show that execution of specific motor skills provides a critical foundation for corresponding perceptual abilities. Relatedly, studies of children with cerebral palsy indicate that restrictions in movement are associated with lower IQ and general mental development,[112] implying a more fundamental role of sensory feedback in perceptual development and adaptation than might seem intuitively obvious. As a more specific example, when infants first develop mobility, usually by creeping or crawling forward, they begin to code location by using stationary landmarks rather than themselves as a reference point.[113] That is, this perceptual-cognitive ability to recognize the self as having the potential to change locations and large, inanimate objects as more reliable sources of information about where self and other objects are positioned in space seems to develop, at least in part, in response to the development of self-generated locomotion.

This chain of developmental progress that begins with mobility, however, may influence aspects of development beyond this perceptual-cognitive shift in perspective taking. Children born with spina bifida with associated hydrocephalus show extreme delays in self-generated mobility and, among other learning differences, also tend to have more difficulty with reading comprehension despite relative intact abilities in vocabulary, listening comprehension, and functional literacy.[114] One skill that appears to help typical to strong readers is the ability to maintain the perspective, including the visual perspective, of the protagonist in literature.[115, 116] While current research cannot yet define the precise nature of these interrelations, it is certainly likely that delays in independent mobility provide a compromised foundation for a perceptual cognitive ability (mature perspective-taking for spatial orientation) that later plays a role in a complex verbal ability to comprehend literature. This and other evidence indicates that the execution of motor skills actually alters brain development.[117] Such findings support the idea that physical activity not only enhances the development and practice of gross motor skills but also the development of subtly associated cognitive functions.

Activities to develop physical skill and refine motor development can be included in early childhood education and development environments through games and group play. Rhythmic, stability, locomotor, and manipulative skills are important and can be addressed in a number of ways. Most importantly, though, these activities should make a meaningful link with social, emotional, and cognitive development. Physical activity not only promotes cognition but also can enhance a child's social skills and self-esteem through group participation.

Social/Emotional Development

What, how, and how much children learn in school will depend in large part on the social and emotional competence they developed as preschoolers.[118]

Several of the factors identified in a recent paper by Huffman, Mehlinger, and Kerivan as causal risk factors for early school problems can be described as factors that reveal compromised relationship skills: difficulties establishing and maintaining relationships with important early caregivers and peers.[119] The timely development of emotional security and age-appropriate social skills are certainly helpful in supporting children's relationship skills and thus also greatly facilitate children's ability to participate more fully and successfully in learning experiences. These early, preacademic successes also lay groundwork for more positive attitudes toward the school experience that continue influencing children's social and academic behavior as they progress to higher levels of education.

In its careful review of neuroscience and developmental science, *Neurons to Neighborhoods* calls attention to just the kind of important role children's earliest experiences and relationships play in developing their later propensities in feeling and impulse management as well as in their social interpretation and responses. The abilities to regulate the self and relate to others in turn influence a child's ability to fully benefit from educational experiences.[120] There are specific kinds of early academic experiences for which children with inadequate socioemotional development are particularly at risk. Children who "act out" antisocially also participate less in classroom activities, receive less instruction and less positive feedback from teachers, do more poorly on academic tasks, and are at greater risk for delinquency and dropping out.[121] These kinds of studies may elucidate the reasons why, even over and above factors such as cognitive skills and family background, children's display of socially disruptive behavior predicts academic adjustment in first grade.[122] These findings highlight the importance of establishing early childhood programs that support all aspects of children's development.

Since coping skills enable children to overcome challenging tasks in any domain, they represent an important step in social and emotional development. In fact, 46 percent of kindergarten teachers report that at least half of their students have difficulty coping with the transition to school.[123] Preschool and child care teachers also identified, in a study by Arnold, McWilliams and Arnold, disruptive behavior as the single greatest challenge in their work and, further, that they perceive an increasing number of children to be disruptive and aggressive in their classes each year.[124] These and similar issues can be ameliorated or corrected with appropriate attention to social and emotional development in the preschool years.

Additional ideas for attending helpfully to early social and emotional development come from the literature on the kinds of early skills that appear to make disruptive behavior less likely. In order to support optimal social/emotional development, early childhood teachers must know what social and emotional skills preschool children should be developing at this stage. As summarized in "Ready to Enter,"[121] children who have a more optimal transition into the school environment tend to be able to identify the true emotions of themselves and others, have prosocial skills that support

more positive interactions, manage negative emotions that inevitably arise from daily challenges of the preschool environment, enjoy learning, and work effectively on their own within the structure of the classroom.[121] The skills identified here often are interrelated. For instance, while children need to be competent at recognizing and tolerating the full range of emotions, they also will increase their positive interactions—and thus their opportunities for further development of prosocial skills—if they particularly share positive emotions with their peers.[125] In addition, children who accurately recognize distress in others and then react prosocially rather than antisocially to that distress are more likely to have social success.[126, 127] Some of these skills can be directly taught, and all are best supported by sensitive teaching and child care practices that also encourage supported involvement of the child in resolving his or her own difficulties. It is important to remember that as children's social skills increase, their opportunities to build language and cognitive skills through interactions with others are greatly enhanced.

Supporting these kinds of social skills is a process that benefits from other developmental domains and components that deserve emphasis in high quality early childhood classrooms. For example, children's language competence tends to influence their ability to identify emotions, and close, responsive teaching is easier when student–teacher ratios are kept to manageable levels. Reading is another activity carried out in quality early childhood settings that easily can turn into a social learning situation when parents and teachers take the time to ask about the emotions and social situations of the characters. These kinds of interrelations between competence in one area of early childhood development and another support the central premise of this chapter. That is, when early classrooms include appropriate attention to the full range of skills important to this period of development, the individual skill areas are actually enhanced, not diminished, by the presence of instructional time in the other areas.

Cognitive Development

If preschools are to help all children achieve their promise … then teachers must believe in all children as learners.[128]

The authors of *Eager to Learn: Educating our Preschoolers* assert that young children are better able to learn than has been acknowledged in current practice and that good educational experiences in the preschool years include integrating more "academic" topics from letters to counting.[129] Neglecting the cognitive domain can result in academically underprepared children who fall behind early in school and cannot catch up. When unprepared children repeatedly fail at early academic tasks, they tend to lose motivation and persistence, and eventually the "unwilling" or "delayed" child is left behind by the system. Positive early learning experiences, however, contribute to lifelong learning characteristics such as curiosity, persistence, and independence, which improve a child's ability to succeed in school and have positive implications for broader measures of life adjustment and success. Even very young children are able and motivated to learn cognitive, language, and literacy concepts appropriate to their level of understanding. Early classrooms best capitalize on this eagerness to learn via a combination of child-directed discovery and direct instruction from teachers about basic preacademic concepts in vocabulary, language, and numeracy.[130]

In order to fill this need, early childhood educators should choose intellectually challenging content that connects with young children's abilities and interests. This does not entail "dumbing down" K–12 standards and curricula.[131] Rather, research-based resources provide a wealth of information on which concepts and skills have the greatest impact on later learning and will create the most enjoyment for preschoolers.[132] In addition, there are specific cognitive concepts children particularly benefit from mastering at these early ages. The broad areas that quality cognitive curriculum should include to provide age-appropriate instruction include areas of oral language, phonological awareness, print knowledge, and basic mathematical skill preparation. Each domain involves concepts that are well within the learning abilities of the preschool child and which can easily be made exciting and interesting to this age group.

Within the *oral language* domain, preschoolers need to build vocabularies that inform them about the world, use language to construct relationships and categories, and solve problems. In fact, research has revealed positive correlations between differences in oral language skills and later differences in reading.[133, 134] However, the nature of this relation differs depending on the age of the child. Specifically, for early readers and prereaders the relation is indirect and unidirectional where there is a more specific, significant relation between vocabulary and phonological sensitivity (a component of phonological awareness), which in turn strongly predicts early decoding skills.[135-137] For older children, the relationship between reading and language is more direct and bidirectional. That is, children with strong language or semantic skills are better able to comprehend what they are reading,[138-141] and those who read well more often develop larger vocabularies and conceptual and factual knowledge bases.[142]

Preschool competence in *phonological awareness*—the ability to use the sounds in words to process spoken language—involves developing a sensitivity to, ability to manipulate parts of, and ability to use sounds in words. The components of *phonological awareness* are phonological sensitivity (e.g., identifying rhymes or distinct syllables at young ages), phonological memory (e.g., immediate recall of verbally presented information), and phonological access (e.g., remembering which sound is associated with a letter or word). Research suggests that phonological awareness develops stability during the late-preschool period [143, 144] and constitutes a powerful predictor for early reading and spelling.[136, 137, 145]

Adequate early print knowledge requires a demonstration of the knowledge of the units of print (letters, words), ability to translate print to sound and sound to print (i.e., associate the letter with the sound), and basic comprehension of book and print concepts. Even simple knowledge of the alphabet at school entry is a remarkably strong predictor of eventual reading achievement,[146 , 147] though part of the power of recognizing letters may come from the role this skill appears to play in supporting growth in phonological sensitivity.[143] Interventions that teach children both phonological sensitivity and letter knowledge appear to have more powerful effects on reading outcomes than those that target letter names alone.[146, 148]

Young children will be better prepared for beginning math concepts in school if they leave preschool with an understanding that numbers can show how many, describe order, and be used for measurement. The earliest geometry concepts involve simply recognizing shapes and knowing how to begin talking about how to represent objects, directions, and locations in the world and the relations among them. Preschool levels of data analysis include an ability to understand how to classify, represent,

and use information to ask and answer questions. Finally, the earliest foundation for algebra can be found in preschoolers understanding that patterns help us recognize relationships and can be extended to make generalizations. Research already exists documenting that preschoolers can and generally do understand a great deal about these early mathematical principles. For example, studies suggest that children begin to integrate counting knowledge with an understanding of arithmetic and even "invent," strategies to operate on objects by four years of age.[149, 150] Researchers also are beginning to understand something about the individual differences among preschoolers regarding who does and who does not master these early mathematical concepts. For example, middle-income children outperform low-income children on verbal math-related problems but not on similar nonverbal problems,[151] and all children perform better on nonverbal mathematically relevant problems until about 6 years of age.[152] However, as investigations about early process in acquisition of mathematical skills are more recent, little has been examined as yet regarding the role these early skills play in predicting competence in later, more complex mathematical abilities.

Early care settings must address the interdependency of physical, socioemotional, and cognitive domains in order to provide high-quality, developmentally appropriate care. Parents and educators should be aware of and use the interrelationship of the domains to organize children's learning experiences in ways that help children develop optimally in all areas and that make meaningful connections across domains. In essence, because the domains are so interconnected, it is not whether a particular domain, such as cognitive skills, should be introduced to a child, but how, when, and in what context.[153] The most effective and appropriate approaches to early learning and development will engage children in all three domains in a way that is both meaningful and enjoyable for preschool-age children.

Chapter V.
Elements of a Preschool Education: Practices for Engaging Children in the Developmental Domains and Assuring School Readiness

Key concepts involved in each domain of preschool learning must go hand in hand with information and skill acquisition.[154]

A key to developing effective practices for promoting school readiness is the integration in the classroom of five key elements, each known to be important to young children's learning and development. While each adds to a teacher's ability to build a strong foundation for children's learning, their influence when combined into an integrated and comprehensive whole is greater than the sum of the parts.

The five elements that are key to effective preschool programs are:

1. Consistent use of a Responsive Interaction Style to support learning,
2. Content that builds cognitive and social skills known to predict school readiness,
3. Planning that takes advantage of recent brain research for the development of memories,
4. A balance of teaching strategies, and
5. Flexible groupings of children for learning activities including one-to-one, small groups and large groups.

Responsive Interaction Style

The sociocultural theory provides an excellent framework to guide teachers in their efforts to support young children's learning.[155] A hallmark of this theory is the importance it places on the child's ability to learn at higher levels with specialized support, referred to as scaffolding, from more competent others (e.g., parents, teachers) than occurs when children attempt to learn on their own. When the responsive interactions occur, young children's social and cognitive skills are placed on more positive trajectories.[156]

A considerable number of studies have examined teacher behavior and their interactions and relationships with children.[157] The resulting literature supports the teacher's anecdotal assertion: *The way in which teachers interact with young children affects the children's social and emotional outcomes either negatively or positively depending on the quality of the interactions.* In light of this, the National Center for Children in Poverty, along with numerous other institutions, recommends a policy of quality early childhood care and learning experiences marked by classrooms with warm teachers and a predictable, stimulating atmosphere.[158]

Responsive interpersonal relationships with teachers nurture young children's dispositions to learn and their emerging abilities. Good teachers acknowledge and encourage children's efforts, model and demonstrate behaviors, create challenges and support children in extending their capabilities, and provide specific directions or instructions. Children are eager and excited to learn, and encouraging this excitement generates positive results in learning new vocabulary, letter names and sounds, and number and science concepts. In fact, close teacher-child relationships in child care are related to greater phonemic awareness and better language, communication, and math skills, as well as more positive attitudes and perceptions, better social and thinking skills, and fewer problem behaviors.[159, 160]

Responsive and appropriate interactions that scaffold children's learning require:

- Sensitivity to a child's level of understanding,

- Responses contingent on a child's signals,
- An ability to maintain and build on a child's focus,
- Rich oral language input,
- Avoiding excessive restrictions on behavior, and
- Providing choices and adapting to a child's changing needs.[161]

By vigilantly observing and evaluating children's needs and happiness in their environment and by providing responsible and responsive care, a teacher establishes a warm and caring environment that helps the child feel comfortable and facilitates the learning process.

An effective teacher needs to show respect for each child's individuality.[051]

Responsive Interactions: Warm, Sensitive, and Contingent on Children's Signals

Early childhood educators set the tone for every interaction that occurs within their classrooms; it follows, then, that cultivating a warm, caring atmosphere will allow children to explore and discover their world without fear of punishment or ridicule. In creating this environment and bolstering children's self-esteem, a teacher makes huge strides in helping a child to achieve school readiness. Teachers can cultivate responsivity and warmth in their interactions with children when they:

- Listen and respond with warmth and sensitivity to children's feelings, ideas, and opinions;
- Use positive language that builds children's self-esteem;
- Show respect for each child's individuality;
- Help children learn self-control by supporting emerging emotional coping skills;
- Offer varied opportunities for children to make choices and decisions;
- Give oral directions after using an established signal to gain children's attention, making sure children understand what is being required of them;
- Encourage children to manage their behavior by setting up a supportive environment (room arrangement, management charts, etc.);
- Establish classroom rules that are clear, simple, and developmentally appropriate;
- Use creative problem solving in all parts of the curriculum; and
- Use the problems that naturally occur throughout the day to model a constructive problem solving approach.[163]

A responsive style needs to be combined with an effective plan for teaching the content critical to school readiness.[164]

Responsive Style + Content Plan

A working knowledge of the major cognitive and social areas of development, which was discussed in Chapter IV, should serve as a guide for the planning of preschool curricula. The remainder of this chapter will provide more details about the type of instruction comprising the content plan, and Chapter VI will provide greater detail on what is included as content.

A content plan needs to take advantage of opportunities to build multiple areas of learning (i.e., math, social, language) within a single lesson, activity, or experience. For example, in an effective "read aloud," the teacher builds vocabulary and background knowledge as she highlights characters or key concepts in the book. Her questioning promotes language expression as the children attempt to describe their thoughts about the book. The "give and take" among the children and their ability to cooperate as she requests that they wait their turn and listen to each other's responses supports their development of social competence. As the book may be about early math, science, history, or literacy (i.e., alphabet book), the read aloud activity builds learning in any one of these important areas.

Of course, the children's ability to learn from this multidimensional activity is dependent on the teacher's use of the key components of a responsive style as previously described in this chapter. In this example, the children's learning can be advanced to a greater extent within this teacher-guided book reading activity than it can in an independent activity, such as a child looking at a book on his or her own. This only occurs, however, if the teacher's reactions are contingently responsive to the child's signals, incorporate rich and appropriately paced language input, are used in ways that build on the child's focus of attention, and are warm and supportive.

Thus, when the content areas known to predict school readiness are presented in this responsive style, children make large strides, and the level of achievement necessary for school readiness can occur.

Responsive Style + Content + Planning That Effectively Builds New Memories

Before outlining general ways to build language, literacy, math, and social skills, the teacher can better assure that children learn—build knowledge that sustains—through effective planning and implementation of activities that provide new information. Time Windows, a theory that describes how memories develop,[165] can guide planning in the early childhood classroom. This theory suggests that children learn a new concept (eg., the name and characteristics of a novel animal) if they have repeated experiences with the concept that occur in close proximity in time.

One might imagine a child hearing for the first time about a rabbit. This might occur during a science or a read aloud activity. In the first exposure, the child hears and sees that this long-eared soft animal is called a rabbit. Touching the rabbit helps the child remember rabbits are soft.

Time Windows suggests that this new vocabulary word and its connection to an animal with long ears, a fluffy tail, and soft fur will be more likely to "stick," or be processed and integrated, in the child's mind if the child has multiple related exposures or experiences with rabbits that occur close in time to the first exposure. This approach allows a memory to develop and become solidified. Without repeated exposures that occur close in time, the emerging memory fades.

As early childhood teachers plan the activities across a day, week, and month, attention to this theory should support more effective teaching. The use of rich themes (i.e., underwater sea life, things that fly, gardens, or construction) makes it easier to

build repeated related experiences for children. For example, when a child learns about a garden across many days and related but varied activities, they begin to make connections between the tools needed to plant in a garden, the flowers and vegetables that go in gardens, gardening clothes (gloves, hats, boots), and the purpose of soil, nutrients, sun, and water.

It's easy to see from this example how much fun a teacher can make learning about gardens. With thoughtful intentional planning, new vocabulary skills are promoted. As children think about the beginning letters and sounds in the new words, they are exposed to literacy, and math occurs as they count out the seeds they will plant. Of course, social/emotional skills are supported as they share their garden tools with their classmates, take turns digging or describing plants, laugh together as they make up silly alliterations or sing rhyming songs (eg., Mary, Mary, quite contrary, how does your garden grow?).

This approach assures effective learning, in part, because it incorporates the three 'P's,: [166]

- Purposeful
- Planful
- Playful

With attention to the three 'P's, teachers always will ask "What is the *purpose* of this?" before they put an activity in their lesson plan. The answer should be:

- It builds one or more of the skills necessary for school readiness,
- It expands and builds on children's current level of understanding, and
- It encourages the understanding of new information that has direct links to what children will need to succeed in kindergarten.

After meeting this criteria careful *planning* occurs. This includes:

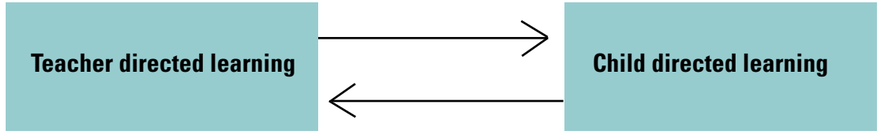
- Selection of fiction and nonfiction books for group readings and their placement in the centers so that new knowledge is encouraged;
- Selection of activities that take advantage of the overlap among language, literacy, and math skill domains;
- Identifying fun phonological awareness games to use when transitioning children from one activity to another; and
- Being sure books, materials, activities, games, and conversations are engaging and *playful*.

Implementing Effective Plans + A Balance of Teaching Strategies

Two teaching strategies that often are contrasted are "direct" and "indirect" instruction. Direct, or explicit, instruction often has been discouraged in early childhood settings because it is frequently associated with high structure or with scripted approaches. This is unfortunate, as explicitly, or directly, instructing children about the meaning of new words or how something works is an important aspect of supporting young children's learning. Rather than assume that this more explicit form of instruction equates with a "skill and drill" approach, early childhood teachers can observe and determine those times when children will benefit from directly instructing them about interesting new areas. Given the young age and limited attention span of three and four year olds, this type of instruction needs to be relatively short and encourage child participation through questioning, the use of "hands on" materials, and physical movement.

Indirect instruction has been interpreted in numerous ways. To some it means that children have the freedom to choose what they want to do. With this interpretation, children often spend a lot of time in a variety of centers, exploring the materials on their own or with other classmates. Sometimes those centers look the same across the year, or they might be refreshed with new materials. For some teachers, guided instruction of children's efforts in the centers is included in their interpretation of child-directed learning. In this case, the teacher would observe and comment on conversational topics or actions with objects or make links between the child's play and a literacy or math concept. Although this is an effective way to scaffold children's learning, many teachers do not perceive that they have a role in children's explorations and play. In a descriptive study examining early childhood teachers' beliefs and practices of their role in children's play, most saw themselves as observers and there only to keep children safe.[167] Of the 65 teachers in the study, only four saw play as an opportunity for making connections with literacy, and as few as 15 viewed it as a time to promote thinking. The teachers' role in children's play and exploration of materials has been described as "multifaceted," including being an organizer of the environment, facilitator, a manager, and a scribe. As more teachers accept this range of roles, child directed learning should enhance the teacher-directed activities to provide the best balance for school readiness.[168]

Just as a teacher must ask questions about the purpose of teacher-directed activities, the purpose and manner with which child-directed activities occur must also receive attention, careful planning, and teacher involvement. While striking a balance between teacher- versus child-directed learning is quite logical, early childhood classrooms that achieve this balance are the exception rather than the rule. In child-directed approaches, the teacher may establish learning centers that incorporate books and materials that assure children will have repeated exposure to concepts (i.e., information) the teacher has previously shared. The teacher-directed activities may lead to child-directed learning. The direction, however, could be reversed such that children's explorations and observations may lead to the teacher setting up an experiment or a math task to build on the children's interest. The important point is that it is not one versus the other approach, but a balance of the two in ways that complement one another.



Incorporating Flexible Groupings + Balanced Strategies + Effective Planning + Content + A Responsive Style

The fifth key element is the inclusion of different types of groupings (one-on-one, small group, large group) of children across the day. Children receive higher-quality relations with teachers when there is a smaller teacher-to-child ratio.[169] This may occur because the teacher is more likely to respond sensitively to children's signals, including

their attempts to verbalize, when she is interacting with smaller numbers of children. As preschool classrooms often have as many as 20 children, it is challenging for teachers to provide this individualized responsiveness. However, for activities such as "read alouds," small groupings of children are more likely to encourage children's "talk" than large group readings. The presence of a teaching aide or an assistant teacher often allows for more opportunity to use flexible groupings of children. With a team teaching approach, one teacher can work with a small group of children, while the other teacher moves around the centers scaffolding the learning of the other children or possibly carrying out an activity with them in a large group. It is important that all children benefit from participation in flexible groupings.

One-on-one:

- Provides the teacher the opportunity to individualize instruction and meet special needs.

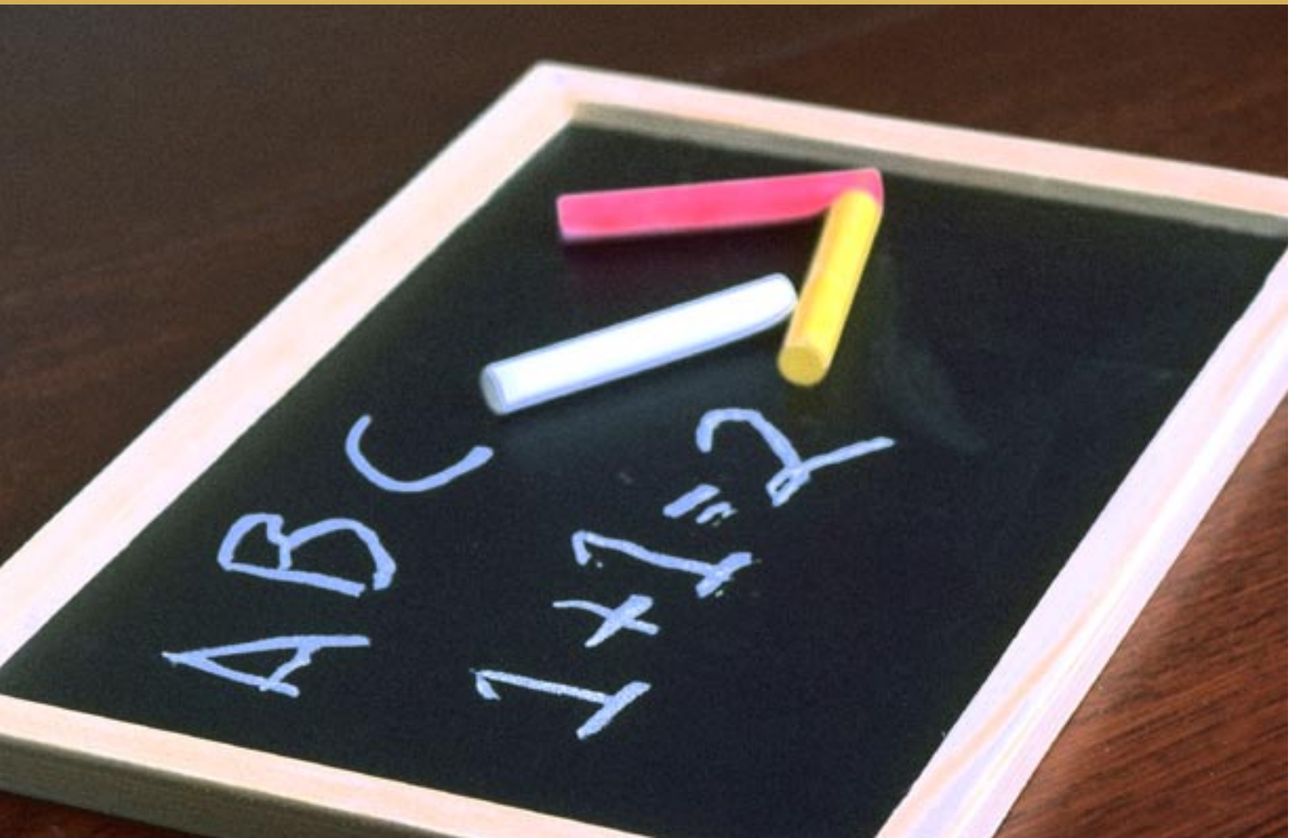
Small groups:

- Allows children more opportunity for talking,
- Provides the teacher opportunity for scaffolding, and
- Encourages hands-on activities and child discovery.

Large groups:

- Builds a sense of community, and
- Sets the stage for the introduction of theme, information about new concepts, and review.

Chapter VI.
Content Areas: Combining These With the Elements Necessary for Effective Preschool Programs



Oral language develops in a social context: A child must be included in talk, not merely surrounded by it.[170]

Language Building

Children learn oral language by listening and talking to adults around them.[171] Caregivers who model appropriate speech allow children to learn to distinguish linguistic units and to learn about nongrammatical cues that model speech provides.[172] Explaining words and sounds, talking to children about objects and their names (labeling), and using expanded vocabulary are all ways in which caregivers and teachers can help to build children's oral language skills. Supporting children's language skills is critical as it will help them excel in their reading and writing skills. In order to enhance language development, early childhood programs must attend to the three major inputs for early language acquisition:

Vocabulary Development: Children's vocabulary acquisition is rooted in social interactions—particularly those guided and enriched by teachers and parents—via stories and songs (both listening and telling/singing), talking about experiences, and word play. The best opportunities for closing gaps in early vocabulary development exist in a child's preschool and early primary years. University of Toronto studies indicate that repetitive reading in the early years may mitigate, and even compensate for, lags in vocabulary acquisition.[173] And while reading to children from lots of different books, and a few repeatedly, helps children, they have a higher retention rate for new words when parents and teachers take the time to explain words while reading.[174]

Language Development: Teachers can facilitate language development by using labels for objects and actions, providing explanations, and frequently reading books aloud; children acquire language skills more rapidly if words exist in a social context. Using oral language play and engaging words, songs, games, and books will help to enrich children's language skills.

In scaffolding children's language acquisition, it is important for teachers to:

- Model the use of rich vocabulary,
- Use open-ended questions to encourage thinking and language use,
- Give children adequate time to respond,
- Expand on children's ideas using new vocabulary, and
- Promote conversations among children since as the quality and frequency of conversations with other children in one-on-one or small group settings increases, children's language abilities grow.[175]

At-home Reading: Parents can build language at home (see Partnership for Reading, sidebar). Research literature documents the importance of children's access to and experiences with books in their homes and interactions that focus their attention on letters and sounds in words. Frequent book reading by parents relates strongly to school readiness—children whose parents read to them on a regular basis, beginning in early childhood, have a higher likelihood of acquiring age appropriate language skills.[176]

A Whitehurst study found that classroom-based interactive reading does not, in and of itself, sufficiently increase the language skills of at-risk children.[177] To promote significant increases in children's language abilities, early childhood programs must employ an at-home reading component that engages parents in the child's learning.

Partnership for Reading: Help Your Child Develop Language Skills

Parents of preschoolers at home can help to stimulate their language development through these activities:
• When you do something together—eating, shopping, taking a walk, visiting a relative—talk about it.
• Take your child to new places and introduce him/her to new experiences. Talk about the new, interesting, and unusual things you see and do.
• Teach your child the meaning of new words. Say the names of things around the house. Label and talk about things in pictures. Explain in simple ways how to use familiar objects and how they work. For example: "That's a whale! It's a great big animal, as big as a truck. It lives in the ocean."; or "This is a vacuum cleaner. We use it to clean the floor. See how it cleans up the spilled cereal?"
• Help your child to follow directions. Use short, clear sentences to tell him/her what you want done. For example, "Give me your hand, please."; or "Please take off your mittens and put them on the table."
• Play with words. Have fun with tongue twisters such as "Peter Piper picked a peck of pickled peppers" and nonsense rhymes such as "Hey Diddle, Diddle."

Whitehurst concludes that the likely explanation for the home as the more powerful venue for language development relates simply to frequency of exposure—children spend a portion of the day in child care, but spend larger portions at home, so parental reading could happen more frequently and on an individualized level.[178] (See Partnership for Reading, this page.)

Literacy Building

In the past, parents and teachers alike have thought of reading and writing as separate cognitive processes that required specific forms of tutoring in order to develop. Such formal instruction began at school age, when children were seen as ready, and it was considered far more important for literacy building than either exposure to books or reading aloud by parents. However, a 1985 Council on Childhood Reading deemed reading aloud as the single most important activity for literacy building in young children. More recent research has helped us to further understand that the continuous process of language and literacy development begins early in life and depends heavily on environmental influences.[179]

Children take their first critical steps toward learning to read and write long before they exhibit reading and writing production skills.[180] *Sadly, more than one-third of America's young children enter kindergarten lacking the preliteracy skills crucial to school success.* Low-income children have a particularly high risk for literacy deficiencies—this is due in large part to a lack of experiences with books in their environment. For instance, a typical middle-class child enters first grade with 1,000 to 1,700 hours of one-on-one picture book reading, while her counterpart from a low-income family will enter first grade with an average of 25 such hours.[181] Furthermore, of the parents of preschoolers who receive public aid, 47 percent reported no alphabet books in the home, compared to 3 percent of professional parents. These types of environmentally based deficits can severely impair literacy development and later school success.

Continuum of Children's Development in Early Reading and Writing
Goals for Preschool: Awareness and Exploration

Children explore their environment, and teachers and parents help them build the foundations for learning to read and write.

Children can:
• Enjoy listening to and discussing storybooks;
• Understand that print carries a message;
• Engage in reading and writing attempts;
• Identify labels and signs in their environment;
• Participate in rhyming games;
• Identify some letters and make some letter-sound matches; and
• Use known letters or approximations of letters to represent written language, especially meaningful words like their name and phrases such as "I love you."

Teachers should:
• Share books with children, including big books, and model reading behaviors;
• Talk about letters by name and sounds;
• Establish a literacy-rich environment;
• Reread favorite stories;
• Engage children in language games;
• Promote literacy-related play activities; and
• Encourage children to experiment with writing.

Parents should:
• Talk with children, engage them in conversation, give names of things, show interest in what a child says;
• Read and reread stories with predictable text to children;
• Encourage children to recount experiences and describe ideas and events that are important to them;
• Visit the library regularly; and
• Provide opportunities for children to draw and print, using markers, crayons, and pencils.*

*Adams, M. J. *Beginning to Read.* Cambridge, MA: MIT Press, 1990.

In order to ensure that all children enter school ready to learn, early education programs and efforts must support and encourage emergent literacy. When optimal conditions exist in a child's environment, literacy develops naturally, and one of the goals of early education must include cultivating that optimal environment. The natural development of literacy occurs on a continuum—it is a process that happens gradually and builds on itself.[182]

Teachers and parents can support emergent literacy by conceptualizing reading and writing as continuous processes within this continuum rather than as all-or-nothing phenomena and by providing appropriate experiences for children along the way.[183] Such appropriate experiences should include a focus on the four major components of literacy development: alphabet awareness, phonological awareness, print awareness/knowledge, and prewriting. (See Continuum of Children's Development.)

The two best predictors of early reading success are alphabet recognition and phonemic awareness.[184]

Alphabet Knowledge: Young children learn best when information is presented in context and when educators and parents provide opportunities for children to create experiences that make the material meaningful.[185, 186] Rote practice (or the "skill and drill" method) can result in frustration and negative attitudes toward learning. Conversely, meaningful experiences with print provide opportunities for young children to learn the alphabet, build a foundation for the acquisition of literacy skills, and become excited about reading. Young children's exposure to letters should occur in a natural, playful way rather than in a way that requires mastery.[187]

To help children learn their letters, early education teachers should create a context in which children can understand what the alphabet is and how it relates to reading and writing. For instance, teachers can:

- Connect alphabet learning to themes (e.g., plants: A is for apple, B is for bean, etc.);
- Encourage children to play with alphabet puzzles, magnetic upper- and lowercase letters, alphabet lotto games, and other letter games;
- Post an alphabet chart and other letter-oriented media;
- Sing the "alphabet song";
- Read aloud alphabet books and point out letters in story books;
- Appeal to children's senses as they learn about letters (e.g., bake cookies in the shape of letters);
- Help children recognize letter-sound associations; and
- Cultivate a general letter-learning environment.[188]

By the end of preschool, children should be able to associate the names of letters with their shapes, identify 12 or more printed alphabet letters, and notice beginning letters in familiar words.

Print Awareness: As they gain alphabetic knowledge, children learn that letters make up words and that words have meaning. Often, they will begin to recognize familiar or high-frequency words in their print environment, proudly pointing out words in books or on signs and labels. Alphabetic awareness leads directly into print awareness, and teachers can encourage the transition from letter knowledge to print knowledge in a supportive social context. Teachers should use children's printed names to make letters meaningful and to make connections between names and other words. Additionally, a letter wall will allow children to interact with letters and words in print.[189]

According to the handbook *Improving Early Literacy for Preschool Children,* children will benefit from and should have exposure to a variety of print media, and they should become familiar with the idea that print communicates information.[190] Teachers and parents can encourage print awareness through several activities, including:

- Exposing children to different types of printed materials;
- Demonstrating the use and purpose of print;
- Labeling objects in the classroom;
- Reading "Big Books" so as to draw attention to print features—such as specific letters and punctuation—point out the concept of word, and track print from left to right; and
- Pointing to the words and following the print with a finger during read-aloud.[191]

Phonological Awareness: Phonological awareness, or an understanding of how phonemes (the individual sounds of spoken language) are combined, manipulated, and segmented in speech, strongly predicts children's later reading success. Because phonological awareness begins before children have learned a set of letter-sound correspondences, encouraging phonological knowledge does not require print. As they hear and repeat stories, songs, and rhymes, they learn to associate rhyming words, parts of words, and beginning sounds. Most popular nursery rhymes not only tell a fun story for children but also provide them with a rich phonological experience.

Teachers and parents can encourage preliterate phonological ability through numerous types of language play. The Center for Improving the Readiness of Children for Learning and Education (CIRCLE) describes phonological awareness as a set of auditory experiences that teachers can help children to build upon through scaffolding techniques.[192] The following list provides some activities teachers and parents can use to encourage children's phonological awareness in several categories:

- Listening
  - Identifying environmental sounds (cars, trains, airplanes, water)
  - Sequencing sounds
  - Following verbal directions
  - Reversing or substituting words in nursery rhymes or familiar phrases
- Rhyming
  - Rhyming with chants, songs, and finger play
  - Reciting nursery rhymes and other poetry
  - Reading stories with rhyming text
  - Omitting words so that children can fill them in during repeated read-alouds
- Alliteration
  - Grouping objects by beginning sounds
  - Reading and reciting alliterative poems, chants, and books
  - Playing beginning sound games
  - Calling attention to words with similar sound beginnings
- Sentence Segmenting
  - Having children clap/count each word in a sentence
  - Shuffling and reordering words in familiar sentences
  - Making silly phrases by deleting words from sentences
- Syllable Segmenting
  - Having children clap/tap out the syllables of their names and other words
- Onsets and Rhymes
  - Building children's repertoire of familiar nursery rhymes
  - Sorting words into families by rhymes (e.g., c…at, h…at, b…at)
- Phoneme Segmentation, Blending, and Manipulation
  - Singing songs and reading books that involve phoneme replacement

Prewriting: Every child loves to imitate a parent writing a letter or writing notes on the fridge, and this "pretend writing" begins a child's development of skills with the written word. Teachers and parents demonstrate the functional utility of the alphabet

and words when they help children to explore and to express themselves through writing or some written form.

As young children sketch lines and scribble "notes" in an attempt to imitate adults' writing behaviors, they begin to make connections between print and spoken words. Oral and written language develop in a simultaneous and supportive manner, but often, children acquire written language better in the absence of formal instruction. With the acquisition of alphabet and phonemic skills, children also may begin to use phonetic spelling by attempting to write words based on the sounds of the letters. Early education teachers and parents can help to encourage these and other prewriting skills by:

- Setting up activities to exercise children's small hand muscles and develop their fine motor skills,
- Encouraging children to write or scribble,
- Having children keep a daily journal,
- Reading back what a child has "written," and
- Writing down children's ideas and posting them in the classroom.[193]

Senate Testimony of Dr. Reid Lyon

Dr. Reid Lyon, chief of the Child Development and Behavior Branch of NICHD, expounded upon the potential benefits of a 95 percent literacy rate in testimony before the Senate Health, Education, Labor, and Pension Committee in July 2003. He remarked on the enormous impact such a high rate of reading proficiency would have on children, their families, and society: Preschool programs that succeed in promoting children's language and early literacy skills—so they enter school with age-appropriate competencies—have been proven to change the course of children's school careers and their adult lives.*

Since 80 percent of children reading poorly at the end of first grade still are reading poorly at the end of the fourth grade, and 75 percent of students reading poorly in the fourth grade continue to flounder in reading into their adult years, limited reading abilities [among young children] portend dire consequences. In 1999, the American Management Association reported that 38 percent of job applicants displayed deficiencies in basic reading and math skills. The Ohio Literacy Resource Center further reports that limited literacy skills cost business and taxpayers approximately $20 billion annually in lost wages, profits, and productivity, and that at least 50 percent of the chronically unemployed are functionally illiterate. Of the students entering a four-year college in 2003, approximately 25 percent will require remedial reading courses—a serious resource drain on a college. Of students entering community colleges, 40 to 60 percent will require remedial reading support. How might this picture change if 95 percent of our young children experienced little to no difficulty in reading?

A child's preliteracy skills—alphabetic awareness, phonological awareness, print awareness, and prewriting—all develop in a synergistic and co-dependent way that begins very early in the child's life. As young children grow, developing their abilities in these areas directly influences literacy and school success. *According to National Research Council estimates from 1998, if children receive proper exposure and systematic opportunities to develop foundational language, reading, and emergent writing skills during early childhood, as few as 5 percent may experience serious reading difficulties later on.*[194]

Math Building

Some controversy has existed concerning the teaching of mathematical concepts to young children. However, merely watching a child hold up three fingers to tell her age will convince even the skeptic that young children have a capacity for numbers and mathematical concepts.

The National Council of Teachers of Mathematics (NCTM) and the National Association for the Education of Young Children (NAEYC) contend that the concern surrounding math stems from confusing what children learn with how they learn it. Just as with language and literacy building, removing mathematical concepts from their social context through drill-and-practice methods makes them inaccessible to children: It's important to teach young children about geometric shapes, but unnecessary and ineffective to teach shapes through memorization drills and lessons.[195, 196] Rather than teach many skills by rote memorization, teachers can plan rich environments and offer sequenced opportunities for children to explore math concepts through play. Effectively supporting early mathematical competences requires attention to children's natural interests and learning styles, including play, drawing, and talks.[197]

While a tendency exists to reduce young children's math curricula to counting, simple sorting, and identifying basic shapes, children actually can explore a wide variety of math concepts through play, including comparison, estimation, patterns, symmetry, and spatial relationships.[198] To effectively use play as an instructional tool, however, teachers must recognize that math is about thinking, not merely manipulating quantities. Young children's math concepts should include thinking about numbers and operations, geometry and spatial sense, patterns and algebraic thinking, and displaying and analyzing data.

Essentially, mathematical thinking equates to problem solving. This important skill develops best in environments that support logical thinking and verbalizing the methods children use while problem solving.[199] The core of any early education mathematics curriculum should focus on developing young children's ability to problem solve—developing their capacity to ask thoughtful questions, to recognize problems in their environment, and to use mathematical reasoning with familiar materials in the classroom.

Preschool teachers can help children construct mathematical meanings from their experiences in a variety of ways. The NAEYC and the NCTM guidelines for appropriate classroom practices include:

- Enhancing children's natural interest in mathematics and their disposition to use it to make sense of their physical and social worlds;
- Basing mathematics curricula on knowledge of child development;
- Representing, communicating, and connecting math ideas;
- Sequencing important mathematical concepts;
- Actively introducing math concepts, methods, and language;
- Integrating math with other activities and vice versa;
- Providing ample time, material, and teacher support for play, a context in which children explore and manipulate math concepts with interest.[200]

Furthermore, teachers enhance children's mathematics learning when they ask questions that provoke clarification, extension, and development of new understanding. Asking these kinds of questions can promote a particularly important math-

ematical concept: algebraic thinking. Specifically, algebraic concepts provide young children with the foundation they need to acquire and understand more complex academic concepts in their school years. The NCTM contends that developing algebraic thinking skills in the early years is imperative to later successes in mathematics and problem solving. Such concepts include:

Patterns: Position patterns, shape patterns, and movement and rhythm patterns all develop pattern recognition skills. Allowing children to work with various repeating series invites them to identify relationships and form generalizations.

Mathematical Situations and Structures (e.g., equalities/balance, inequalities): Comparing quantities and making quantities of objects equal, etc., will provide experience with this concept. Understanding equalities and balance will help children to more readily solve for unknown variables in their school years.

Models of Quantitative Relationships: Real-life modeling of various ways to compose a given quantity (e.g., one red ball plus two green balls equals three balls, and two red balls plus one green ball also equals three balls) helps develop this skill. Teaching quantitative relationships through every day classroom experiences will allow children to learn to represent and verbalize the different ways to compose certain quantities.

Qualitative and Quantitative Change: Cultivating experiences that promote the understanding that most things change over time, that changes can be described mathematically, and that changes are predictable (e.g., growing and consistently measuring a class plant) help children to grasp this concept.[201]

Social/Emotional Elements of Preschool Education

While a preschool education should include activities that strengthen cognitive skills, it must provide for the development of the social and emotional competencies required for school readiness. The vast majority of social/emotional development occurs with little or no formal instruction but with appropriate teacher guidance surrounding social situations such as play, sharing, conflict resolution, and empathy. Consistent use of the key responsive components of a responsive style promotes social and emotional skills like cooperation, positive affective exchanges with others, regulation of behavior, and social problem-solving.[202, 203] As young children encounter and overcome new and various social obstacles when playing with their peers, guidance from teachers and parents will enable them to learn the acceptable and unacceptable ways of dealing with social and emotional stress and/or excitement.[204] Teachers and parents can help children develop meaningful and rewarding relationships with their playmates and with adults that will offer them the social and emotional support they require.

In addition to peer group and adult–child interactions that help children develop socially and emotionally, teachers and parents can help to reinforce understanding of social situations with rich, socially relevant educational material and thought-provoking questions. For instance, books about children's relationships with people, animals, and the environment can serve as jumping off points for social and emotional lessons. During a read-aloud, for example, teachers might use the story as an opportunity to ask children about emotional situations—"Why is she crying?" and "What made him mad?"—or about problem solving—"What could they do to make this work?" Such emphasis on the characters and their emotions and social situations will help children develop empathy and better understand their own social and emotional environments. Recent studies of child care quality suggest that children who were able to attend preschool classrooms that included close teacher–student relationships, relatively low levels of disruptive behavior, and adequate opportunities for prosocial experiences exhibit higher levels of academic performance during their first two years of school than children who were subjected to classrooms without these characteristics.[205]

Recently, greater attention has been given to the development of specific curricula and intervention/prevention programs to support social/emotional skills for preschool children. These programs provide activities and teacher training components that more explicitly attend to providing young children with the input and support they need to develop social/emotional learning. For example, in a 32-week program developed by Denham and Burton,[206] children learn about emotions, social problem-solving, and prosocial behavior through book-reads with discussions modeling role play, games, and guided creative play. Preschool PATHS (Promoting Alternative Thinking Strategies) also includes many similar activities for promotion of emotion knowledge.[207] These are centered around playful characters introduced to the children through book reads and followed up with techniques teachers are trained to use to support children learning to understand their emotions and those of their peers and how to regulate their behavior in order to get along with their peers. Although limited evaluation of these programs has occurred, decreases in children's showing negative emotion and increased peer skills have been described.[208] Improvements in emotion regulation from both of these programs is attributed, in part, to the Turtle Technique,[209] which young children learn to use to control their negative emotions. Children are guided to pretend they are a turtle that can pull into their shell by closing their eyes and putting their heads down and their arms close by their bodies. By doing this they are able to stop, feel, and think about the experience and resist behaviors like hitting, yelling, or pushing. As regulation of negative emotions and aggressive behavior are key milestones for 4-year-olds and critically important for school readiness, these playful but effective techniques seem to have an important role in our preschool programs.

Ultimately, academic learning takes place in a social and emotional context, and preschool teachers will need to cultivate the relationship between learning and social and emotional development. Nonetheless, even when all these emotionally sensitive and socially educational techniques are implemented in classrooms, there will be some students who need targeted mental health or behavioral interventions in order to succeed in the classroom and minimize disturbance to other children. Responsible early childhood classrooms also need referral lists of qualified professionals in their area that can help families with children who need more intensive, personalized intervention to regulate emotions, attention, and behavior.

Physical Development in Preschool Education

Responsive teaching and observation concern not only a child's social and cognitive development, but his or her physical development as well. This is critically important as the development of certain motor skills is thought to determine, in part, the emergence of particular perceptual and cognitive abilities.[210]

As with social and emotional development, physical development can take place

within the context of other learning tasks. Teachers should encourage children to develop gross and fine motor skills and to stretch the limits of their physical capacity. Physical achievements help children to gain and maintain self-confidence, stability, and even contribute to such activities as writing.

In light of the importance of early motor development, teachers should provide opportunities for vigorous physical activity. Running, hopping, starting and stopping, changing direction, and catching and throwing are the prerequisites for the games of middle childhood that further advance children's cognitive and social development. The teacher should be a good role model by participating as much as possible with these activities. Vigorously interacting with children not only sets a good example of physical activity, but also results in children's showing signs of improved mental health and emotional status[211] and closer teacher–child relationships.

General Knowledge

Young children learn about the world around them through their experiences, conversation, exploration, and play. The richer each of their experiences, the more depth children have in their general knowledge. Disadvantaged children have particularly limited opportunities for this type of learning, but quality preschool programs can help to fill some of the general knowledge gaps they might experience. While cultivating children's general knowledge does not require that a portion of the curriculum for a preschool class be set aside specifically for that purpose, it does require that rich, informative, and exciting materials be used for instruction and play in the other domains of learning: language, literacy, math, social/emotional, and physical development.

Quality preschool programs can cultivate and enhance children's general knowledge by:

- Reading fiction and nonfiction books to the children daily,
- Encouraging and answering children's questions,
- Providing new and varied experiences in the classroom,
- Providing outdoor explorations and field trips,
- Teaching thematic units on interesting topics,
- Varying the topics for classroom work/play centers on a weekly basis.

With a purposeful plan to broaden the foundational knowledge of their preschoolers, early childhood teachers and parents can effectively help children reach the doors of the elementary school prepared to learn. Concentrating on a rich curriculum that integrates concepts and skills from the developmental domains will help to ensure that each child receives the most positive and educational experience possible. The most important of the aspects of a child's preschool education is the integration of the developmental domains into a challenging, stimulating, and rewarding experience that provides every child with a contextually meaningful foundation of knowledge and skill on which they can build in their later years.

Chapter VII.
The Learning Environment: Physical Arrangements, Activities, and Social Relationships

The successful teacher carefully plans the physical arrangement of the room and the routines for using it.[212]

There is strong consensus in the field of early childhood development concerning the importance of considering the mutuality of influences between children and their environment, including the people they interact with as well as the characteristics of the activities and physical space they share with others.[213] Often, the definition of high quality care settings includes such structural features as low ratios of children to adults, small group size, and well-trained caregivers. Definitions also have included characteristics of the adult–child interactions, such as sensitivity and stimulation, i.e., responsiveness to the children's needs and signals, positive affect, and frequent verbal and social interaction.[214] Researchers also have identified several features of child care that predict school readiness. Somewhat logically, centers identified as high quality based on environmental and social relationship parameters often incorporate many other school readiness features. Predictive factors include the amount of reading, one-to-one teaching interactions, displaying functional and environmental print, use of planful lessons, and incorporating materials in play that promote literacy in play settings.[215-217] In addition, this research implicated the physical setup and richness of a child's classroom or home care environment as significant factors affecting early development.

Physical Arrangement of Spaces: Promoting Positive Early Childhood Outcomes

Effective classroom management can set the stage for exciting possibilities for children's learning. This includes attention to the organization of the space and furnishings, predictable daily routines, and responsive interactions between teachers and children. While these factors often are described as distinct, their interconnection is critical for promoting effective teaching.[218]

Successful teachers know that the arrangement and management of the early childhood classroom have direct effects on the kinds of behaviors children exhibit as they live and work together. The difference between chaos and an orderly atmosphere that facilitates learning depends in great part on how the teacher prepares the environment. That preparation involves what happens before school begins, when children arrive and depart, when schedule transitions occur, when children interact freely with equipment and materials, and when conflicts arise.

At the beginning of each school year, before the children enter the classroom, the teacher must set up the environment properly to be successful. A well-planned physical room arrangement rich with environmental print impacts language development and the interactions among the children. Children enjoy small, cozy spaces with materials and books easily accessible. Much more talking can occur with this arrangement and many fewer accidents. [219]

A ready school provides a physical setting that is both safe and appropriate for the children's level of development, ensuring children's physical and emotional security, stimulating their imaginations and intellects, and meeting their changing needs over time.[220]

Components of such an environment include:

- Protecting children's health and safety;
- Supporting children's physiological needs for activity, sensory stimulation, outdoor experiences, rest, and nourishment;
- Providing a balance of rest and active movement throughout the day; and
- Protecting children's psychological safety (i.e., children feel secure, relaxed, and comfortable rather than disengaged, frightened, worried, or stressed).

"The specific environments that children experience influence their concurrent behaviors as well as their subsequent development."[221]

Setting Up the Physical Space

Teachers must consider a number of factors and components of the physical space when setting up the classroom. The strong consensus regarding these factors is highlighted in the 2000 report *Eager to Learn: Educating our Preschoolers*.

Traffic Patterns: Furniture and play center arrangement should consider which areas children use most often and which play centers or areas should logically be located close to the door, to the sink, to the teacher's desk, etc.

Materials Placed at the Children's Level: Things the children use should be put where they can reach them. When the children can access needed materials without having to ask the teacher to get them, they become more independent and activities proceed more quickly and smoothly.

Organized Storage: The old adage, "A place for everything and everything in its place," strictly applies in the early childhood classroom if the teacher hopes to avoid chaos, confusion, and a messy room. Children need the security that organization provides. All materials should be labeled to assist with organization and to reinforce literacy skills. Crosser (1992) reports that when children are helped to organize their world, they learn classification skills and a sense of satisfaction from being independent and self-sufficient.[222]

Adequate Equipment and Supplies: Centers should have certain basic equipment and an ever-changing variety of materials to intrigue the children.

Clearly Delineated Areas: Each area should have low and well-defined boundaries. Low boundaries allow the teacher an unobstructed view of the children at all times and give the room a more open, interactive feel.

Coordinated Placement of Centers: Teachers should separate noisy areas from quiet areas and place interlinked centers, such as the dressup and kitchen areas, near each other to encourage creative interaction.

Small-Group and Independent Work Areas: The authors of the Ontario Early Years Study wrote that when learning environments support problem-solving through play, children receive a form of rich stimulation that can be incorporated and integrated into core brain development.[223] Therefore, separate learning areas are important for facilitating self-directed but teacher-guided hands-on activities on a variety of subjects and skill levels. In small groups, a child has the additional benefit of interacting with other children on a more personal and rotating basis.

Large-group areas: Early education classrooms need an open area large enough to accommodate all the children at one time for whole-group meetings. Specific considerations for this space include whether the children can sit comfortably or perform large muscle movements without feeling crowded and making the area free of distractions so that the children will focus on the large-group activity.

It goes without saying that classroom furniture should be child-sized. In addition, the classroom should be clean, well maintained, interesting, and attractive. The classroom should be colorful and well lit and should contain ethnically diverse posters, pictures, and books, and displays of the children's work throughout the classroom.

Using Physical Space to Promote Language and Literacy

Creating a classroom that promotes children's language and literacy development should focus primarily on ensuring that language and literacy materials (e.g., books, writing utensils, print) are located throughout the classroom.[224]Techniques common to the early classroom, such as thematic units and dramatic play activities, can promote literacy development when integrated across classroom activities.[225] A high-quality oral language and literature-rich environment addresses a few key research-based findings.

First, studies show that providing even the most basic print-rich environment requires a *minimum of five books per child* in the classroom.[226] Access to a *wide array of print* provides opportunities and tools for children to see and use written language for a variety of purposes. Secondly, child-directed learning areas should have multiple *materials that make connections to relevant literature* as a means of hands-on reinforcement of language and literacy skills.

The developmental effects of a child care arrangement depend on its safety, the opportunities it provides for nurturing and stable relationships, and its provision of cognitive and linguistically rich environments.[227]

Organization and Routine of Activities: Promoting Effective Learning

Classroom management, or the manner in which activities are conducted throughout the day, is closely linked with the physical arrangement in achieving a successful environment. The NAEYC recommends that children experience an organized environment and an orderly routine that provides an overall structure in which learning takes place; the environment should be dynamic and changing but predictable and comprehensible from a child's point of view. The learning environment provides a variety of materials and opportunities for children to have firsthand, meaningful experiences.[228]

Classroom management components should include color coding, daily plans, and discipline expressed with clear expectations, consistent use of rules, and frequent feedback.[229] *The key to management is a set routine.* Children feel more secure when there is structure, so a well-planned day with built-in supports is critical to the children's behavior, well-being, and receptiveness to learning. The CIRCLE Professional Developmental model of the Texas State Center for Early Childhood Development encourages the following management components.[230]

Use of charts can help with classroom management. Charts help order the daily routine, allow children to use print in a meaningful way, and provide examples of print around the classroom. Management charts that incorporate pictures or icons help make a visual impression upon children. Some examples of possible charts include:

Rules Chart: Teachers should use strategies to ensure that children understand expectations about classroom rules, activities, and directions.

Helpers Chart: Certain aspects of the daily routine can promote social competence by providing opportunities for children to help with tasks. To encourage children to read the chart, list as many jobs as possible and change the jobs frequently. Children should be involved in thinking up the jobs and watching the teacher create the chart.

Attendance Chart: Another means of teaching independence and responsibility while freeing the teacher for more substantive activities is to have an attendance chart During large-group time, the attendance helper can count the number present and absent.

Daily Schedule Chart: While an intuitive practice, the use ofa daily schedule chart to give children a visual plan of what their routine will be on any given day is supported by research. The teacher can explain the chart, pointing out the words and the matching icon or picture of the activity, so that the children can associate the action with the printed word.

Learning Area Planning Chart: Planning charts have words and pictures to illustrate the purpose of each learning area. The charts provide children with an opportunity to make choices and to actively participate in their own learning. Each planning chart should include the name of the learning area, an icon representing it, and a number that tells the children how many can use that area at one time.

Classroom Activity Planning: Creating Opportunities for Interaction as Well as Self-Discovery

Developmental early childhood education is built on two beliefs. First, that each child's unique development requires a flexible program. Each child has an individual pattern and timing of growth as well as individual personality, temperament, learning style, and experiential and family background. Therefore, decisions about curriculum and adults' interaction with children should be as individualized as possible. It is important for teachers to be attentive to the manner and pace of individual children's learning so it can be maximally supported.

At the same time, however, interaction, understanding, and cooperation with other children and adults are crucial skills to develop for children at this age. Supporting children in learning to adapt and function successfully in a classroom setting is a key component of early childhood education. With these two principles in mind, preschool programs should include opportunities for both individual and group activities to allow for independent exploration as well as socialization.[231]

Large-Group Instruction: There are many times when a teacher may gather the entire class of children together as a group for the purposes of providing information, supporting collaboration, and listening to their ideas. Large-group sessions should occur two to three times per day in a full-day program, but just once in a half-day program, and last only 15 to 20 minutes. During this time, the teacher can:

- Deliver a morning message,
- Go over the schedule for the day,
- Conduct a read-aloud,
- Allow the children to share news,
- Engage the children in a language or phonological awareness activity,
- Announce a "Special Person of the Week" or a birthday,
- Lead the children in a musical activity, such as a song, or
- Introduce an instructional theme.[232]

Small Group and Individual Learning Areas: Children learn best when working in separate, set-apart learning areas. These are not places to go for playtime activities after the "important" instruction. In small group learning areas, the children cement the instruction with guided exploration and hands-on experience. With a little creativity, even home care environments can set up effective learning centers. Every learning area should have:

- Fun and purposeful activities,
- A literacy connection,
- Writing materials, and
- An opportunity for conversation (language) with an adult or another child.

Developmentally appropriate programs provide opportunities for children to broaden and deepen their behavioral knowledge. They provide a variety of firsthand experiences and help children acquire symbolic knowledge by representing their experiences in a variety of media, such as drawing, painting, dramatic play, and verbal and written descriptions.[233] Furthermore, while small-group learning schedules involve lots of time for child-directed learning, the teacher is as active as the child in directing learning and supporting discovery. In fact, the teacher provides and encourages the critical interactions that turn play into learning. Research suggests the seven following types of centers:

1. Pretend and Learn Center
2. Writer's Corner
3. Library and Listening Center
4. Construction Center
5. Math and Science Center
6. Creativity Station
7. ABC Center[234]

These areas should integrate at least eight different learning concepts, including mathematics, phonological awareness, reading aloud, motivation to read, letter knowledge, written expression, print and book awareness, and language development. Well-stocked learning areas supplied with books and other educational materials will help promote the integration of these academic concepts.

Data from the behavioral science literature have long pointed to the need to create safe, secure, supportive environments for infants and young children. Overall, a positive and effective classroom environment makes classroom management easier, gives children ownership of the classroom and the power to manage themselves, respects each child's individuality, and recognizes and promotes children taking responsibility in the classroom community. This type of learning-conducive environment will create positive impacts on young children's development, preparing them to acquire skills needed in both school and in life. A properly set up and maintained classroom

provides the essential foundation upon which a teacher can build to effectively promote children's success and school readiness. (See figure, this page.)

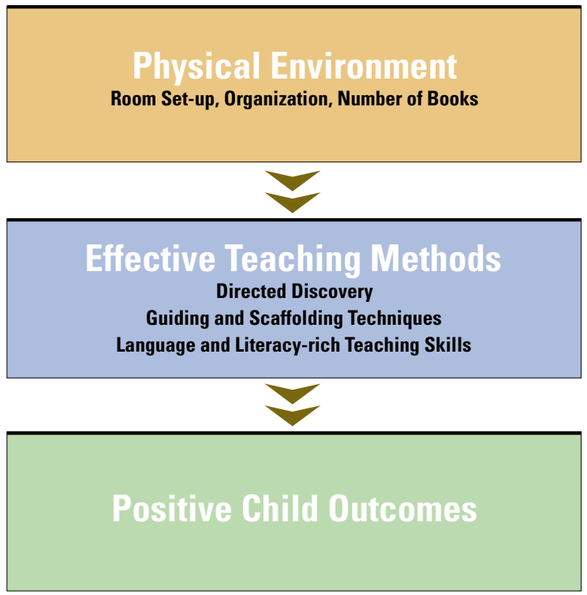


Figure 5*

While physical room set-up is an undeniably important part of positive child outcomes, the correct room set-up or number of books alone cannot promote child development. Rather, positive childhood outcomes require the intervention and guidance of a w .

* Landry, S., and Precourt Debbink, M. *Conversation Regarding Early Childhood Environments,* January 2004.

Chapter VIII.
Teacher-Child Interactions and Professional Development: The Keys to High-Quality Early Childhood Education

"I've come to the frightening conclusion that I am the decisive element in the classroom. It's my personal approach that creates the climate. It's my daily mood that makes the weather. As a teacher, I possess a tremendous power to make a child's life miserable or joyous. I can be a tool of torture or an instrument of inspiration. I can humiliate or humor, hurt or heal. In all situations, it is my response that decides whether a crisis will be escalated or de-escalated and a child humanized or dehumanized."[235]

Not only does the teacher affect children by the classroom setup and the schedule of activities but the quality of the teacher's interactions with the children can affect them in powerful ways. Each one of us remembers a particularly good or particularly frightening teacher we have had throughout our school years, and that lasting effect is telling evidence of the influence of teachers on the attitudes and development of every child. A key to assuring that young children have effective teachers is to assure that teachers have effective professional development.

If we only took the simple step of assuring that poor and minority children had highly qualified teachers, about half of the achievement gap would disappear.[236]

Good teachers provide appropriate levels of challenge, help children question their own assumptions, and encourage them to think about and recognize relationships between objects.[237]

Teachers as Facilitators: Building the Foundations for Children's Development

Cultivating these aspects of positive teacher–child interactions enables the teacher to support cognitive readiness in ways that promote strong social and emotional skills. One of the most responsive instructional techniques that teachers can use is scaffolding. As teachers guide and cultivate each child's experience, they can help the child to stretch just beyond the edge of their developing capacities. For instance, a teacher may model a behavior, then guide the child in mimicking the behavior, and then finally watch as the child performs the behavior on their own. Scaffolding requires teachers to know the capacities of each child so as to guide them through tasks that will challenge but not overly frustrate them.

Using a scaffolding technique creates positive and meaningful interactions between the child and the teacher as they work together to stretch the child's capacities. Scaffolding also allows teachers to build on children's interests to develop their skills. Children learn most effectively when competent adults scaffold instruction in ways that allow them to move from "other-regulated" to "self-regulated" activities as their attention, cognitive, language, and motor skills mature. Effective scaffolding also re-

quires fewer restrictions and more choices for the child as the teacher monitors behavioral and skills progress. (See example in Teacher Stimulation of The Young Child.)

Teacher Stimulation of the Young Child to Influence Development

Stage 1 of Child Development	Teacher's Role
Lack of smooth coordination of attention	Demonstrations, modeling
Short utterances	Directives/questioning
Immature eye–hand coordination	Gestures, eye gaze
Early initiative-taking skills	Responsiveness, slow pacing
Immature interaction skills	Maintaining attentions and focus
Stage 2	
Increased ability to shift gaze from teacher to learning activity	Questioning
Increased vocabulary	Commenting
Ability to direct other's attention	Guiding
Ability to cooperate, follow requests	Responding, observing
Stage 3	
Coordinated attention skills	Increased opportunities for child to take lead
Regulated behavior skills	Questions that encourage thinking
Flexible use of language (provides explanations, descriptions)	Observations
More sophisticated social skills	Build on interests, challenge new dis coveries (give and take, turn-taking)

In the role of facilitator, teachers have the greatest impact on young children's learning. Teachers who are true facilitators of learning are active observers of children's actions and explorations. They offer challenging materials and activities appropriate to the children's developmental level, support the identification and contemplation of relationships between objects, and facilitate children's critical evaluation of their own assumptions. Facilitation strategies that promote the development of higher-order thinking skills should include asking predictive questions about stories or events, asking children to analyze the motivations of characters in stories, encouraging children to use their imagination, extending children's play, and prompting children to talk about their work and/or play.[238]

Meaningful, capacity-building, and responsive relationships with children will, in the long run, create positive attitudes toward school and learning, cultivate literacy and math development and critical thinking, and generate positive self-esteem. Neither parents nor teachers nor communities should underestimate the impact of a positive experience with teachers on a young child's emotional, social, physical, and cognitive development. Positive teacher–child interactions are crucial to a high-quality early education experience.

Professional Development: Continuing Improvement and Support for Teachers Improves Quality in Preschool Experiences

What teachers know and do is the most important influence on what children learn.[239]

Positive teacher–child interaction and continuing professional development each improve program quality, which in turn contributes to higher levels of child learning and development. Evidence indicates that both enthusiastic and motivated professionals and professionals who have been trained in early childhood education improve program quality.[240] Presumably, the two characteristics go hand in hand: Professionals will have more enthusiasm and motivation if properly trained and will continue to enhance their skills throughout their professional careers.

Another important factor in determining the quality of care consists of the interaction between a caregiver and a child. Fortunately, teachers can learn and develop appropriate and effective techniques for positive teacher-child interactions. Through careful and continued development, teachers can build their effectiveness as educators over time. Therefore, professional development comprises an essential element in achieving quality child care. Caregivers trained in early care and education are more responsive to children's needs and are better equipped to help children succeed.

The Educational and Training Level of the Teacher Makes a Difference

Research indicates that overall quality of care and children's language skills increase with increased education level of caregivers. Additionally, teachers' specific training and experience in child development relates to the quality of care they provide. In fact, in one study, teacher background made an independent contribution, over and above teaching behaviors and children's activities, to children's outcomes.[241] Coherent teacher preparation programs at various levels of cost and time investment prove more successful in promoting effective teaching and children's experiences than simply having teachers take college courses or attend informal workshops.

Although teachers with the most advanced education and training appear to be the most effective, teachers with associate of arts degrees and Childhood Development Associate certificates were more effective than teachers with some college or just high school plus workshops.[242] Most importantly, children placed in the care of teachers with more education and training have better child development outcomes.[243]

The old notion that teachers of young children need little formal education and training is being repudiated by a growing body of research. Recent research shows that the majority of variability in the quality of teachers' behaviors with young children is explained by whether they were trained formally in early childhood education.[244] Professional development lies at the heart of effective education reform, particularly when it is firmly rooted in research.[245] Additionally, research indicates that proper training can help to overcome the potential deficits faced by teachers without bachelor's degrees. While training cannot replace a college degree in the long run, it can and does help early childhood educators, regardless of degree status, to facilitate better child outcomes.

Barriers to Professional Development and Quality Care

The responsibility placed on child care workers remains severely out of line with their preparation and baseline abilities.[246]

Unfortunately, the education and training that child care workers—even degreed teachers—receive does not match the roles and demands actually encountered on the job. The combination of difficult tasks, low wages, and high expectations has created such an untenable situation that it comes as little surprise that child care workers may not adequately help preschool children reach their developmental potential.[246] (See Snapshot of Child Care Workers, this page.)

Snapshot of Child Care Workers

Estimated Number of Child Care Workers
1.5 Million in center-based and licensed family care providers

Estimated Average Salary
$6.70 – $8.16/hour

Estimated Average Turnover/Year
35 – 40%

Training/Preparation
Minimal Requirements

Leading Reason for Turnover
Low Pay

Generally speaking, a study conducted by the Annie E. Casey Foundation reveals that child care workers have a high turnover rate, are paid less than those in comparable jobs or with comparable skills, have limited opportunity for growth and advancement, and have little guidance or support.

Research shows that a modest salary increase of 10 percent can make the difference between mediocre and quality child care.[247] Nonetheless, that 10 percent constitutes a big increase to working class parents who can't afford to pay more and don't understand the difference it would make. Most parents overestimate the quality of care their children are receiving and don't know how little child care workers are paid or how hard they are to find and keep.

The difference between a good and a bad teacher can be a full level of achievement in a single school year.[248]

High turnover, often related to low pay and a lack of advancement opportunities, further threatens high-quality care because children cannot form meaningful child–teacher relationships if caregivers come and go.[249] Studies show that greater stability among early childhood teachers produces higher levels of social and cognitive functioning among children in their care. This means that simply retaining the same teachers benefits children. Alternatively, as high job turnover in the field continues, the quality of services that children and parents receive can only deteriorate.[250]

In order to counteract the barriers to high quality educators entering the child care field, there must be increases in pay and an effort to professionalize those who care for young children by providing them with support, assistance, and respect. The Annie E. Casey Foundation suggests the following for retaining, training, and professionalizing teachers:

- Rewards for superior performance,
- Reasonable workloads,
- Career paths that build on workers' skills rather than moving them "up and out,"
- Clear performance expectations that relate to a coherent organizational mission,
- Training and development opportunities on the job, and
- Adequate base compensation.[247]

Breaking Down Barriers to Quality Programs: Appropriate Training Has a Powerful Influence on Program Quality

A central part of the practice of improvement should be to make the connection between teaching practice and student learning more direct and clear.[251]

As the Shanker Institute noted in its report on professional development, teachers are still, for the most part, treated as solo practitioners operating in isolation from one another under conditions that severely limit their exposure to other adults doing the same work.[252] *It is critical to provide early childhood teachers with training and access to help in dealing with the unique issues surrounding the education and care of very young children.* Well-trained teachers can make a world of difference in a child's school readiness and cognitive development. In light of this, training for teachers should occupy a top priority among parents, communities, and administrators alike.

According to the National Partnership for Excellence and Accountability in Teaching, professional development activities—regardless of their content and goals—are more likely to be effective when:

- The content focuses on what children should learn and how to address the different problems students may have in learning the material;
- Professional development is based on analyses of the differences between actual student performance and goals and standards for student learning;
- Professional development involves teachers in identifying what they need to learn and in developing the learning experiences in which they will participate;
- Professional development takes place primarily in the classroom and is integrated into the day-to-day work of teaching;
- Most professional development is organized around collaborative problem solving in small groups of teachers;
- Professional development is continuous and ongoing, involving follow-up and support for further learning, including building support networks between multiple schools and garnering support from sources external to the school that can provide new perspectives;
- Professional development incorporates evaluation of multiple sources of information on outcomes for students and the instruction and other processes involved in implementing lessons learned through professional development;
- Professional development provides opportunities to understand the theory underlying the knowledge and skills being learned; and
- Professional development is connected to a comprehensive change process focused on improving student learning.[253]

A large-scale study of school reform efforts, encompassing more than 1,000 school districts, recently showed that *every additional dollar spent on more highly qualified teachers produced more gains in student achievement than any other single expenditure.*[254] This powerful evidence suggests that not only should teacher training and education be a top priority but that it also is a sound investment. An example of the effectiveness of the connection between training and quality comes from the U.S. Department of Defense (DOD), which delivers the largest and, arguably, the best child care program in the country. Its success is clearly linked to the fact that DOD treats teachers like soldiers, giving them the training and equipment they need. All frontline staff are required to complete an 18-month training and certification program. In addition, 75 percent of DOD's child care centers are certified, compared to 7 percent nationally.[255]

The quality of their early care has implications for DOD children's school success. In spite of high poverty rates, mobility of families, and modes of parental education, reading and writing scores were at the top of most states. Factors accounting for this success include:

- Intensive teacher development that is relevant to academic achievement goals and student performance,
- Small school size with a focus on trust and communication,
- High expectations for students, and
- High-quality child care and preschools with a focus on preparing children to succeed in school.

One of the most potent forces for positive growth for teachers is on-site coaching from experts. A powerful example comes from El Paso, Texas, where a collaboration between the University of Texas at El Paso and three El Paso school districts showed that an investment in assuring quality teaching demonstrated a significantly narrower gap between children from impoverished backgrounds and those who were not. This was due to more than 50 full-time teacher–coaches providing in-school assistance to teachers in combination with summer training institutes across five years. Similar results are reported for other states using this approach.[256] The important lesson is that professional development is not just a three-hour workshop about an isolated topic but should be an ongoing, on-site strategy focused on the content that students learn.[257]

Steps necessary to ensure quality early childhood education through the professionalization of early childhood educators include:

- Each group of children in an early childhood education and care program should have a teacher who has a bachelor's degree with specialized education related to early childhood. Achieving this goal will require a significant public investment in the professional development of current and new teachers.
- Education programs for teachers should provide them with a stronger and more specific foundational knowledge of the development of children's social and affective behavior, thinking, and language.
- Teacher education programs should require mastery of information on the pedagogy of teaching preschool-aged children.
- All early childhood education and child care programs should have access to a qualified supervisor of early childhood education.
- Federal and state departments of education, human services, and other agencies interested in young children and their families should initiate programs of research and development aimed at learning more about effective preparation of early childhood teachers.[258]

These steps to put in place degreed and specialized teachers should follow on the heels of efforts to train and professionalize existing staff and educators. As the research indicates, degreed teachers do offer better outcomes for children, but training can overcome some of the deficits that nondegreed teachers might face.

Ultimately, teacher–child interactions and professional development should intertwine to create the most positive experience possible for the child. Both of these concepts should be approached and undertaken in a child-focused way. By concentrating on children's needs and skills, teachers' development directly benefits the children it is intended to benefit. Teaching strategies, teacher–child interactions, and professional development should together make up a systematic approach to improving outcomes for all children.

In a statewide study evaluating the impact of the CIRCLE professional development model on 750 early childhood teachers, classroom observations measures taken across a two-year period showed strong gains in teachers' use of effective language and literacy approaches.[259] For example, ratings of their book reading skills showed that most teachers who initially did not engage children by discussing new words or using animated facial expressions and voice inflection at the beginning of the school year were doing this at high levels after the training. Their classroom environments became "print rich," with charts, labels, and colorful posters for children to touch, point to, and talk about. Children's books and writing materials were in the activity centers, and teachers were guiding children to explore these materials. As these changes occurred, gains in children's learning also occurred. After two years of this type of professional development, 70 percent of the programs had children showing gains in their language skills that were significantly beyond those of children in classrooms that did not have the training.

While many teachers were initially reticent and some were resistant, their testimonials at the end of the program revealed dramatic shifts in their attitudes:

- "When the children have more language, they solve their problems better."
- "You can see them light up."
- "It's an indescribable feeling to see children who had low self-esteem become confident individuals."
- "Children with speech disabilities are speaking more to other children."
- "Children will come in and tell us how they feel without being asked."

The trainers and mentors for this program found that adequate time was key to success. It was important for the professional development program to span two years rather than expect strong positive changes within one year. Mentors found that a teacher embraced the new approaches more readily if her existing skills and beliefs were valued and integrated into the new strategies and approaches she was being coached to use.

An Effective Tool for Helping Teachers to Improve

The Center for Improving the Readiness of Children for Learning and Education (CIRCLE) designed an exemplary training model for professional development. Critical components of this training model include:

- **Small group interactive learning**
- **Side by side in-classroom coaching**
- **Involvement of all levels of staff**
- **Systematic evaluation of change in teacher and child skills**
- **"How to's" for ongoing teacher training**
- **Opportunities for practicing specific skills (role-playing, lesson plans)**
- **Ongoing training to reinforce and refine skill development**
- **Three-day administrator, coordinator, and mentor training**
- **Training of coaching skills**
- **Use of teacher observation checklist.**

Consistent with principles for improving professional development outlined in the research literature, the CIRCLE model extended teachers' professional development activities over time with opportunities for sharing experiences and ongoing learning among teachers. Teachers received interactive training on specific ways to teach early literacy, phonological awareness, and math skills. The teachers practiced developing and integrating materials and activities and participated in role-playing to facilitate their interactions with children. All training occurred in small group (n = 15) learning pods, and follow-up training across the year enhanced the initial training.

The CIRCLE model also includes coaching and mentoring as necessary components of a complete professional development package. In a project application of this model, the teachers were grouped with mentors charged with becoming a source of support and knowledge rather than exercising any kind of supervisory role. Frequent visits of the "pedagogical" advisers played a critical role in providing teacher support and producing positive long-term outcomes for children. During their visits, the mentors provided expertise with lesson planning, assessment, side-by-side coaching, and demonstration lessons. Areas showing improvement and those still needing improvement were discussed with the individual teacher.

CIRCLE developed ways to allow for close monitoring, provision of technical assistance, group problem-solving, and evaluation of teachers. Teacher buy-in and involvement of administrators as part of the instructional team also were important components of the professional development. The result was that this professional development model successfully prepared teachers to support children in making greater gains in language, literacy, and math skills.

The CIRCLE model shows that teachers' participation in extensive weekly and monthly inservice training sessions, in addition to frequent visits of pedagogical advisers, accounts for positive long-term outcomes for the children. In fact, adequate training of teachers accounted for better scores and learning among children than did having a college degree but having no training time.

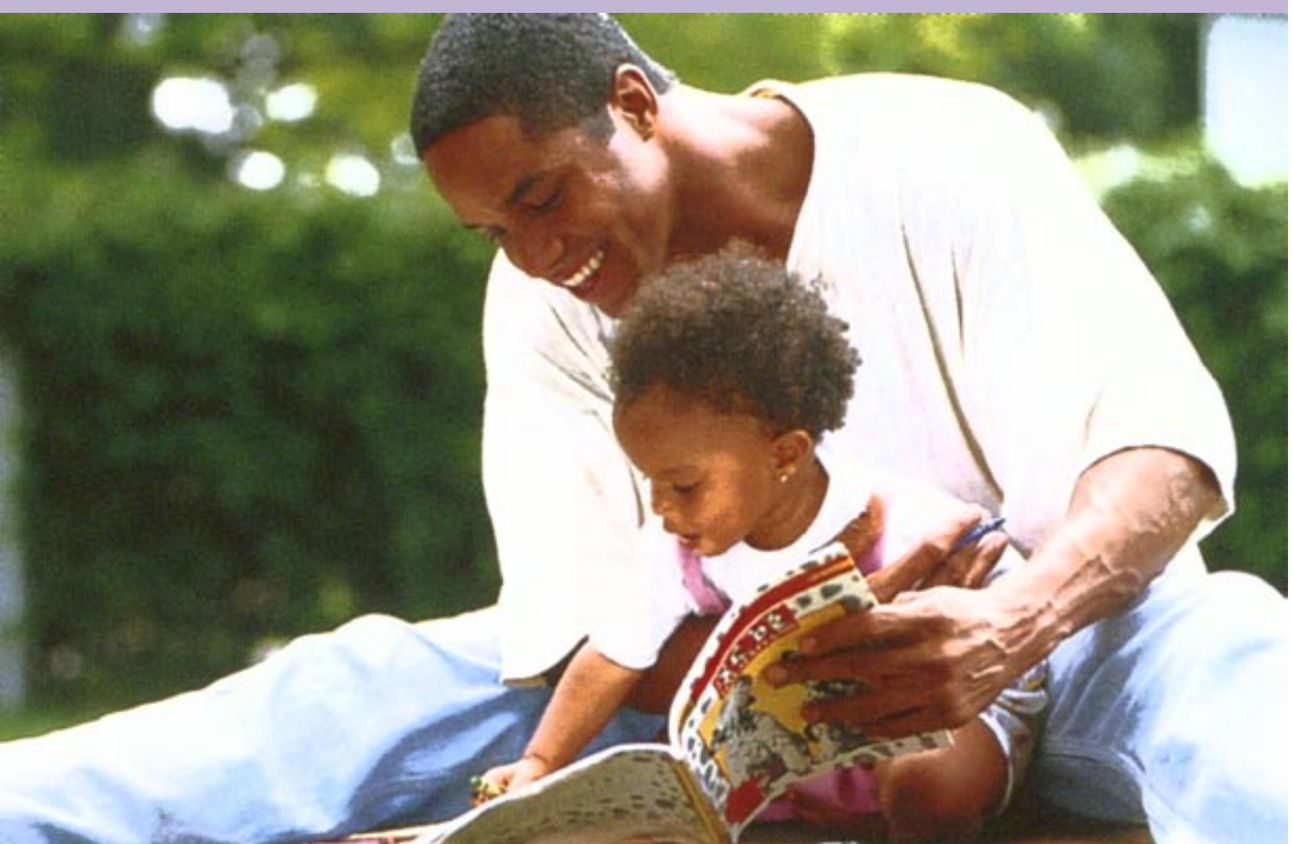
If mentoring is to function as a strategy of reform, it must be linked to a vision of good teaching, guided by an understanding of teacher learning, and supported by a professional culture that favors collaboration and inquiry.[260]

Mentoring: Ongoing Support for Teachers so That They Can Support Children's Learning

Others note that mentoring about curriculum, instructional strategies, relationships, and assessment tools are a necessary part of a complete professional development package.[253, 260] For this approach to be effective, teachers need to be grouped with mentors who are a source of support and knowledge rather than exercise any kind of supervisory role. Mentoring became very popular in education in the 1980's, but only more recently has it become part of the early childhood field. Mentoring often is viewed as a strategy to prevent high rates of teacher attrition especially for beginning teachers. Various models of mentoring have been implemented in early childhood programs including one-on-one classroom modeling with coaching and weekly small support group meetings. Limited evaluation of the effectiveness of mentoring has been conducted and thus little is known about the characteristics of mentoring that are necessary for it to be most effective.

Thus, while there is general enthusiasm about mentoring, there is still a great deal of research that is needed to examine the context, content, and outcomes associated with mentoring. This will be particularly important for the early childhood field as mentoring could potentially support teachers without degrees or adequate training to learn to incorporate the interaction styles, content, and instructional practices necessary to promote school readiness.

Chapter IX.
Parents: Critical Players in Children's Development



Education commences at the mother's knee, and every word spoken within the hearing of little children tends towards the formation of character.

—Hosea Ballou (1771-1852)
American Theologian

Parents are a child's first and most important teachers. They represent perhaps the single most influential factor in their children's development. While curricula, educators, and early care settings all contribute significantly to children's learning and development independently of parental factors, the fact remains that parental characteristics, behaviors, beliefs, and involvement all have a sizeable impact on their children. Those in the business of promoting positive early childhood education and development experiences cannot afford to overlook the sweeping impact that parents have on their children.

Research has identified a broad range of factors through which parents directly impact the level and rate of children's social/emotional, linguistic, cognitive, behavioral, and even motor development.[261-264] This indicates that a parent's characteristics, beliefs, and behavior can alter a child's development either positively or negatively, and these alterations have lasting implications as the child grows into adulthood.

Given the power parents wield with regard to children's outcomes, numerous programs have emerged to help parents learn better parenting skills—many with mixed results. More importantly, perhaps, early childhood programs have begun to integrate parents and parent–child interaction into the regimen of high-quality care for young children, and this has proven a positive step for many programs. As the old adage says, "It takes a village to raise a child," and early care providers and parents alike must work together to improve children's outcomes. Each child has a variety of caregivers involved in his or her life, and the way these caregivers interact will impact the child's outcomes—both short and long term.

From the ways in which a parent influences a child's outcomes to the ways in which parents and early care providers can work together to improve children's outcomes, this chapter explores the important and multifaceted role parents play in appropriate and high-quality early childhood experiences.

Parent Characteristics Have a Critical Influence on Children's Development

Scientists have come to a consensus on the parental characteristics that predict individual differences in children's development during early childhood. Children of parents with lower income, less education, and greater psychosocial risk—such as substance abuse and domestic violence—are more likely to have poorer developmental outcomes (e.g., lower skills in cognition, literacy, math, social interaction, coping resources).[265] Two of the most consistently reported demographic predictors of child cognitive outcomes are maternal intelligence and years of education. However, the importance of these factors can decrease as intervention becomes more intensive.

When considering factors beyond demographic characteristics, there is a range of parental personal and social characteristics that influence interactive behaviors and child outcomes and highlight the importance of understanding multigenerational in-

fluences on children's development.

Beliefs Regarding Developmental Needs and Parents' Own Childrearing History: For example, parents who believe that children need high levels of restriction and direction are less likely to respond to children's needs with appropriate nurturance and stimulation.[266] In general, persons who had a positive relationship with their parents are likely to have a positive parenting style of their own;[267] in contrast, a parent with an abusive and hostile child rearing history may or may not show a negative parenting style dependent on cultural diversity, life changing events, and child characteristics (e.g., severe illness).[268]

Flexible Thinking and Consideration of Multiple and Reciprocal Influences: These characteristics and their influence on children's behavior lead to parenting that is more sensitive and responsive.[269]

Psychological Well-Being: Low self-esteem, depression, and high-risk mental conditions have a debilitating effect on parents' ability to parent effectively.[270, 271]

Social Support: When parents' social networks provide models for flexibility in interpersonal interactions, respect for others' ideas, and acceptance, they promote parenting views that take the child's interests and abilities into consideration. Social support is a determinant of children's outcomes in that parental warmth, responsiveness, and role satisfaction are related to the amount and extent of support available to the parent. [272, 273]

Quality of the Home Environment: Aspects of the home environment that are reported to predict better outcomes in school readiness and later academic and social competence include availability of cognitively stimulating resources (e.g., amount of books and educational play materials) and trips to a park or zoo. Factors in the broader home and community context can influence caregivers' interactions with children,[274] such as

- Interactions beyond parents (grandparents, friends),
- Access to books,[275]
- The quantity and quality of interactions between the neighborhood schools and parents, and [276]
- Racial socialization practices within families.[277]

Quality of the Community Environment: Communities can help parents get their children ready for kindergarten. For example, family literacy programs can involve families by providing books to prekindergarten children's families and encouraging family activities that expand children's experiences with literature and language. Several studies that have involved families in their children's learning with these methods have shown strong results.[278, 279] Other recommended ways are to:

- Encourage parents to read to their children, starting in the earliest years, and then to take them to the library to pick out their own books and attend special programs for young children there.
- Help parents connect with voluntary local parent education courses, such as Parents as Teachers, Home Instruction for Parents of Preschool Youngsters (HIPPY), and Family Literacy Programs that help parents develop language and preliteracy skills in their young children.
- Encourage parents to take their children for regular visits to the doctor and for immunizations.
- Urge local pediatricians to use periodic checkups to "prescribe reading" and to model effective parenting techniques.
- Help parents find high-quality early care and education programs.
- Take part in efforts to ensure that all child care centers in the area become accredited.
- Encourage parents to get early assistance for children with disabilities and developmental delays so they may receive the special services to which they are entitled in order to help them be ready for school.
- Encourage teen parents to use support programs that help them finish school and learn parenting skills.[280]

Parents Should Be Responsive to Their Children

Consideration of these factors that influence parental behaviors leads to a realization of the need for high quality parent–child interactions for the most optimal outcomes. As often mentioned, warm, accepting relationships between parents and children produce happier, less withdrawn children with fewer behavior problems. Being contingent to a child's needs is called "responsive parenting"—a three-term chain of events in which

- The child shows an action,
- The parent responds promptly and sensitively to the action, and
- The child, in turn, experiences a supportive consequence.[281]

Research suggests that children who experience close relationships with responsive parents (or a consistent caregiver) early in life are more likely to develop healthy relationships with peers as they get older.[282, 283] An early relationship with a responsive parent also serves as a "security blanket" for children, allowing them to feel more secure in exploring and mastering the outside world. Parents who talk with and respond to their children also make them feel as if they have some control over their own environment, boosting their self-esteem.[284]

The Parent Is a Cognitive Agent in the Child's Learning

In this role, the parent provides various learning opportunities that advance the child's development and capabilities as a learner. The extent to which parents provide these experiences is related to their perception of their own role in their children's cognitive development. Those parents who do not believe that they are important as a "teacher" for their child, and assign this role to others (teachers, child care workers) or who believe that cognitive skill development just happens naturally are not going to work at playing the role of cognitive agent.[285] Yet research verifies that the frequency and quality of parental stimulation is important. Specifically, when parents provide high levels of rich verbal stimulation in ways that are contingently responsive to children's focus of interest, cognitive readiness is more likely to occur.[286] Stimulation from parents needs to be responsive to the children's interests and developmental capabilities, highly supportive and not restrictive or punitive, and presented in ways that allow for choices and active problem solving.

Opportunities for Learning with Appropriate Modeling of Language: Children whose parents read to them on a regular basis, beginning in early childhood, are more likely to have age-appropriate language skills.[287, 288] Modeling language by asking questions

that require children to think predicts higher cognitive levels and aids language and literacy development. Early literacy development is enhanced when parents provide access to and experiences with books in their homes and interactions that focus children's attention on letters and sound in words.[289, 290] Rich language experiences in the home promote cognitive readiness for children with different biological risk factors, and are relevant across different ethnicities and economic gradients.[291]

Opportunities for Engagement with Objects: This experience goes beyond toys to household items, playground equipment, furniture, and more. The intent is to allow the child to explore and discover the use of objects, improving cognitive and motor skills with each new learning encounter.

An Array of Experiences with Their Environment: Giving children information about their environment also predicts higher cognitive levels. For example, parents help children understand their surroundings and broaden their world by saying names of objects and animals, explaining how things work, going to a variety of places and describing what the child encounters, allowing the child to feel different textures and taste various foods, and so forth. Once parents understand the importance of their roles and of parent modeling, they can prepare their children for learning by the frequency and type of stimulation they give and by a focus on didactic activities.

The Parent Is a Socialization Agent in the Child's Behavior

A parent becomes a socialization agent[292] through behaviors that include appropriate modeling, responsiveness, and setting appropriate boundaries with a warm style. Both the qualitative aspects of warm responsiveness and specific interactive styles, such as maintaining attentional focus, demonstrate a sensitivity to children's signals and needs that are related to greater gains in social competency. Furthermore, when parents provide clear and consistent boundaries for their children's behavior in warm and sensitive ways, the children are more likely to learn how to self-regulate behavior in terms of emotions, reactivity to the environment, and social interactions.[293, 294] These boundaries can be established with a disciplinary approach that is a cooperative give-and-take interaction between parent and child. When children are able to control their own behavior, they become more socially competent with their peers and teachers, are less impulsive and emotionally reactive, and take initiative more often. In the classroom and in group problem-solving activities, these attributes enable children to more easily develop their cognitive skills as well.

Parenting Intervention Programs Show Mixed Results for Children's Outcomes

Understanding the importance of parents in early childhood development, various intervention programs have been developed to address parent–child interaction. Parenting intervention programs typically come as one of three types:

- Programs that specifically target parenting as the primary focus, such as home visiting programs;
- Programs in which the parent component is one of many components, such as in the welfare-to-work program; and
- Programs that are part of a child-focused intervention that occurs predominantly through center-based care, as in the Abecedarian Project.

In looking at a number of major intervention programs in which parenting was the primary focus, studies show that intervention can be effective in changing health-related behaviors that can influence children's development such as smoking, nutrition, immunization, and reduction in additional pregnancies.[295-297] Additionally, positive influences tend to accrue primarily among those with the greatest need (i.e., those in poverty, with fewer psychological resources, or with English as a second language). In terms of children's development, however, programs vary greatly in whether they have a theoretical rationale for their intervention. When they do, the theory often is not used to develop a specific curriculum that targets how children learn, so there is little to no cognitive benefit for the child.

The assumption that children will benefit from these parent-focused interventions because their parents' attitudes, beliefs, and/or interactive behaviors have changed has not been realized. Reasons for this lack of success may be that

- The parental change is too limited,
- The parental change occurs over too protracted a time period to have a strong and sustained effect,[298]
- There was insufficient intensity, or[299]
- There was insufficient use of adult learning techniques.[300]

A number of large-scale programs have attempted to implement two-generation programs with a multifaceted approach, including a strong focus on the adult by enhancing parental education and economic well-being.[301] The child focus involves case management and home visiting to provide a range of education, health, and social services. Reviews of these two-generation programs reveals mixed effects. Most importantly, short-term effects are evident for measures of parenting including knowledge, beliefs, and behaviors, but effects on children's cognitive development are small or nil.[302] Additionally, programs may have increased parents' attainment of GEDs, but this gain does not positively impact income, employment, scores on adult literacy tests, or the psychological well-being of mothers. Furthermore, these dual-target services and interventions often become broad rather than specific and intensive when addressing the complex problems and needs of low-income families. Since specificity and intensity are two important predictors of program success, this approach has minimal effects.

Alternatively, programs that attach parent components to a child-focused intervention often initially involve home visiting. During the child's first year, intensive focus is placed on the parent, but the focus transitions to the child over the next two years until the child enters a five-day-per-week center-based classroom program. In these programs, cognitive and achievement gains are sustained, at least at moderate levels.[303] Thus, current early childhood practices accept that an intensive center-based school readiness program rather than changes in parental behaviors and/or attitudes is the key mediating factor in children who show gains. *To summarize, critical parenting behaviors involving warmth, acceptance, and responses that are contingent to children's needs must be combined with a quality classroom experience for optimal childhood development.*

Intervention programs need to provide parents with both specific instruction in how to support learning and the cognitive content that should be targeted in parent–child interactions. But modeling parent–child interactions is too subtle and teaching parents to observe and reflect on their own skills is not enough to promote change. Interventions need to take into account many aspects of the family setting including:

- Consideration of cultural and social factors;[304]
- Direct facilitation of change in parents' interaction and behaviors with their children in ways that are sensitive to cultural and social practices;[305]
- Attention to influences from children's larger social context;[306]
- Adoption of change models and measurement procedures that account for the child's influence on the parent as well as the parent's influence on the child;[307]
- Ensuring that interventions have a clear focus;
- Linking intervention to a theoretical orientation that justifies its selection of particular goals and techniques;[308](on next page).
- Addressing whether it is feasible to expect change in parenting beliefs,[309] knowledge, and/or behavior for the target population being served; and
- Ensuring that home visit facilitators understand and accept their role as agents of change.[310]

Parental Involvement Is a Needed Component for a Child's Success in School

Understanding that families also are children's first and most important advocates, the quality and effectiveness of programs for young children are contingent on the degree to which families' needs are met and to the degree that families understand, demand, and are engaged in high-quality early care and education. Achieving this parental involvement also is important because developmentally appropriate practices derive from deep knowledge of individual children and the context within which they develop and learn. The younger the child, the more necessary it is for educators to acquire this knowledge through relationships with children's families.[311]

The National Association for the Education of Young Children recommends the following guidelines for parents and educators working together:

- Reciprocal relationships between teachers and families require mutual respect, cooperation, shared responsibility, and negotiation of conflicts toward achievement of shared goals.
- Early childhood teachers work in collaborative partnerships with families, establishing and maintaining regular, frequent two-way communication with children's parents.
- Parents are welcome in the program and participate in decisions about their children's care and education. Parents observe and participate.
- Teachers acknowledge parents' choices and goals for children and respond with sensitivity and respect to parents' preferences and concerns without abdicating professional responsibility to children.
- Teachers and parents share their knowledge of the child and understanding of children's development and learning as part of day-to-day communication and planned conferences. Teachers support families in ways that maximally promote family decision-making capabilities and competence.
- To ensure more accurate and complete information, the program involves families in assessing and planning for individual children.
- The program links families with a range of services, based on identified resources, priorities, and concerns.
- Teachers, parents, programs, social service and health agencies, and consultants who may have educational responsibility for the child at different times should, with family participation, share developmental information about children as they pass from one level of a program to another.[312]

Children whose parents are involved with their schools do better on achievement tests, and children whose parents reported doing the most activities with them tended to have the highest scores on an applied math test.[313] Early childhood programs and centers should build alliances with parents to cultivate complementary and mutually reinforcing environments for young children at home and at the center.

It also seems beneficial for children's school success to encourage parents to communicate closely with schools about their children's school programs and activities. There are a number of ways parents can be involved with their children's programs in school, including volunteering to help with school functions, attending meetings about their children's progress, helping children with their homework, and reading with them. While it is well documented that schools' provision of information about how to assist their child's progress is important, in a large national study, only 37 percent of parents reported that their child's school provided information on how to help their child at home.[314] The low rate of parents reporting feedback from school personnel in the study suggests more attention and potentially new intervention strategies are needed.

Teachers can initiate improved communication with parents if they inform and involve parents and encourage them to talk, listen, and read to their preschool children. Besides impressing upon parents the importance of reading aloud to their children daily, teachers can

- Inform parents about what their children should learn in preschool,
- Keep parents informed about their children's progress,
- Give parents specific ideas about how they can help out at home, and
- Use home visits, teacher conferences, and parent training classes to keep parents informed.[315]

Since family expectations and support for learning contribute significantly to a child's school adjustment, early childhood educators need to continue to explore ways to help shape parental goals and behaviors that will result in beneficial outcomes for children.

"The evidence is clear that good early child development programs that involve parents or other primary caregivers of young children can influence how they relate to and care for children in the home and can vastly improve outcomes for children's behavior, learning, and health in later life. The earlier in a child's life these programs begin, the better. The programs can benefit children and families from all socioeconomic groups in society."[316]

Chapter X.
Individual Child Assessments: Providing Feedback and Evidence of Success

Assessing children not only helps teachers and parents to meet their children's needs, but also to stay accountable to their communities.[317]

A reciprocally linked and mutually supportive relationship must exist between assessment and instruction in early childhood settings. Assessment has an important role to play in revealing a child's prior knowledge, development of concepts, and ways of interacting with and understanding the world. Assessment is a way of discovering what children are interested in, what they are learning and having difficulty learning, and how they are changing over time. Armed with this knowledge, teachers can choose a pedagogical approach and curricular materials that will support the child's further learning and development. School readiness behaviors are important to assess because they are authentic and legitimate skills. They are too important for teachers to ignore or only "guesstimate." Continued assessment provides teachers with the feedback they need to identify which parts of the curriculum need modification—this constant feedback mechanism allows teachers to provide the most meaningful and effective educational experience possible, as it allows them to constantly focus on and respond to the children's changing needs. Classroom assessment is a critical component of effective teaching; teachers use information from their assessments of children's learning to guide pedagogical and curricular decisions. Preschool teachers must base their instructional choices on what each child brings to the interaction in order to effectively promote learning. Broadly conceived, assessment consists of a set of tools for identifying each child's skill level, learning how children solve everyday problems and conflicts, how they change over time, and what motivates them.

Four reasons for assessment outlined by the National Education Goals Panel[318] and in *Eager to Learn*[319] are:

1. To support children's learning and development,
2. For identification of special needs,
3. For monitoring trends and evaluating programs, and
4. Assessment for school accountability.

Young Children's Needs:
- **Vaccination—Avoid disease**
- **Physician checkup—Avoid growth problems**
- **Assessment of early reading and math—Avoid school failure**

Three questions need to be addressed when considering assessment in the preschool period.

1. Why to assess?
2. What to assess?
3. How to assess?

The description above helps address the first of these three questions. Recent research on school readiness helps address the second question regarding what preschool skills are important to assess. As described in the previous chapters, research shows that three skills in the preschool period are critically important to later literacy: oral language, phonological awareness, and print knowledge. Later school success in

these areas also is influenced by early social and emotional competence, and recent research is beginning to highlight the importance of early math skills for later analytical thinking and other higher level math abilities. The documented importance of these early skills for later school success suggests that the focus of assessments in the preschool years should be here.

At a recent forum held at Temple University[320] a group of invited professionals with expertise in the assessment of young children determined that measures of language, literacy, and math skills need to be able to demonstrate growth in the 3- to 5-year-old period in order to be useful to preschool teachers. It also is important that the normative samples for these measures include a culturally and ethnically diverse group of children and that they are measuring skills that are predictive of school readiness. Important areas of language to assess included, but were not limited to:

- **Development of Words:** This includes word diversity or vocabulary, but also lexical organization (i.e., chairs are a type of furniture) and ability to learn new verbal information easily.
- **Phonology:** This includes the understanding of sounds, such as words that rhyme or begin with the same sound. Other skills in this area are sentence and syllable segmentation, blending sounds, and on-set rhyme.
- **Syntax:** This includes understanding and using a range of different sentence structures such as "Wh" (eg. What, Where, Why) questions and appropriate word order.
- **Semantics:** Knowing the meanings of different words.
- **Pragmatics:** This includes being able to use language in different contexts to carry out a range of functions.
- **Print Knowledge:** Alphabet knowledge, print concepts, and early writing skills.

A lengthy list of early math and spatial concepts were considered important for early assessment approaches. Some of these were the child's understanding of the mental "number line," counting, addition/subtraction, commutative rule on small numbers, and shape composition and pattern sequences.

The proceedings from this forum also outlined the important social/emotional competencies that should be assessed in the 3- to 5-year-old preschool period. These include:

- **Regulatory Skills:** Skills such as attentional control, learning rules, planning and following directions. Emotion regulation is included as part of this construct and includes managing negative affect and displaying positive affect in appropriate ways. As preschool-aged children also are expected to begin to demonstrate growing levels of self-control, their ability to tolerate frustration or resist temptation also is important to evaluate.
- **Prosocial Behavior:** Preschoolers have the challenge of learning how to interact with peers and become aware of the differentiation between themselves and others. Therefore, important skills to include in classroom assessments are children's cooperation and initiative-taking with peers, sharing, conflict resolution, concern for others, and attending to group goals. While one of the biggest social challenges for children in preschool is to learn to engage with and get along with their peers, their prosocial skills with adults also should be considered in assessment protocols.
- **Behavior Problems:** Evaluations of preschool children also should be sensitive to indications of behavior problems that may require specialized attention and specific scaffolding strategies or interventions. These include aggressive children, evidence of being socially withdrawn, or high degrees of distractibility or impulsiveness.

As most assessments of this range of social/emotional competencies are conducted through teacher and/or parent report, some consideration needs to be given as to how differences in teachers' tolerances for different levels of expression of behaviors can influence these assessments. Reports from several adults that frequently interact with a child (classroom teacher, teacher assistant, parent) often provide the most reliable picture.

The question of *how* to assess children (third in the list above) is multifaceted, as it is influenced by a number of factors. For example, if a teacher wishes to determine if a child has age-appropriate school readiness skills, she needs to use a standardized measure. This means the test has a common set of questions, tasks, and materials and that the child's score is based on a normative sample of children. This is important because the child's performance can be related to the performance of a large number of other children of the same age. Sometimes standardized tests are referred to as formal assessment approaches and include a variety of tests used for different purposes.

Formal assessment approaches include:

- Screening Measures: Brief assessment of skills that are important early indicators of later school competence. These provide information on entry level skills at the beginning of the preschool year (eg., Get Ready to Read Screener, see insert page 93).
- Progress Monitoring Measures: Brief measures that are conducted on a routine basis to provide information on what children are learning and rates of improvement across the preschool year. Scores on progress monitoring measure should be predictive of more lengthy (i.e., comprehensive) standardized measures. As progress monitoring measures are brief, teachers can conduct them at least three times across a school year and learn who is or is not demonstrating adequate progress. With this knowledge, teachers report that they no longer have to "guesstimate" what children are learning and can adapt their curricular activities and instructional approaches to be more responsive to the children's needs. (See insert page 93 for example)
- Diagnostic Assessments: This approach is used to obtain a more in-depth analysis of a child's strengths and weaknesses in order to determine what learning supports are needed. Children with mental, physical, or emotional difficulties that may require special services benefit greatly from early detection and diagnosis. For such children, diagnostic assessments can be very helpful. While diagnostic assessments do not determine the underlying reasons for a child's lack of progress, they can suggest a special need. There are many reasons why a child may have difficulty with the early acquisition of academic or social skills. Any or all of the following can explain problems in learning: health, unidentified disabilities, family concerns, or social and emotional difficulties. Fortunately, specific assessments designed to identify underlying problems and disabilities exist and should be used if necessary. Once teachers discover the underlying causes for a child's difficulties in learning, they can seek appropriate assistance for the child and the child's family.

Consumer Guide for Diagnostic Assessment
What makes a good assessment measure?

- **It provides accurate results.**
- **It is reliable. It produces consistent results.**
- **It is valid. It measures what it says it measures.**

Effective preschool programs should use multiple forms of assessment, track individual children's progress in a scientifically reliable way, and use assessment to inform instruction. Assessments, when used carefully and appropriately, can resolve—rather than create—educational problems. Because young children experience incredible growth and learning at an uneven and sometimes unpredictable pace, it is imperative that teachers and caregivers have the necessary training to think about and use assessment well.[321]

Informal Assessments: Tracking Children Over Time

Early childhood teachers have a number of informal assessments at their disposal, including observation, reflection, collection of children's work in portfolios, and checklists. Numerous uses of portfolios include guiding instructional decisions, encouraging children's reflections on their own learning, and sharing information about children's learning with parents. Comprised of samples of a child's work, teacher observations, and copies of developmental checklists, the portfolio provides an overview of the child's development. However, while informal assessment provides immediate feedback for teachers, this type of assessment has a number of limitations. Informal assessments cannot:

- Effectively indicate whether or not preschoolers are learning at rates that will assure they are ready for formal schooling;
- Determine baseline level of functioning;
- Provide norm-referenced information;
- Determine if the child has age-appropriate skills;
- Determine if a child has a learning problem; or
- Offer clearly reliable and valid assessment results.

These goals require formal assessment.

Dynamic Assessments

Literacy assessment can accurately predict success in three early reading areas: oral language, phonological processing, and print knowledge. Providing the best possible literacy experience requires assessing children on these skills. Teachers have at their disposal a variety of informal and formal assessment tools to determine children's literacy knowledge.

While informal assessments such as observation may help teachers to gain insight into the child's grasp of concepts about written language meanings, forms, meaning-form links, and functions, teachers' use of more formal approaches of assessment can provide information about a child's skill levels that more reliably indicates that they are developing skills at levels high enough to assure school readiness. Progress monitoring, or dynamic assessment approaches, are developed for teachers' use, not outside testing professionals' use. When used with children multiple times across a preschool year, teachers can chart gains in skills such as vocabulary, letter knowledge, and phonological awareness.

These tools usually are very brief (about 1 to 3 minutes) and should demonstrate predictive ability when compared to children's skill attainment on more lengthy standardized measures described in the next section. Teachers using such measures report that it informs their instruction and helps them individualize their learning activities because they have more information on each child's learning. As more advancement is made in the development of dynamic assessment tools, direct linkages with curricular goals and content will provide greater guidance for developing effective instruction.

Summary

Overall, educators and program directors must keep any assessments manageable by planning a reasonable time frame for collecting assessment information, selecting only a few of the most informative assessments, and collecting information on a systematic basis.[322] These assessments should align with both the specific curriculum used in the classroom and the state's early childhood standards or expectations.

Results from assessments should be used for purposeful planning of a child's preschool experience. For example, teachers can respond to the feedback received from assessment by changing or enriching play centers with activities that better serve the needs of the children or by providing additional read-alouds if the assessment points to a need for such changes. Furthermore, assessment can indicate which children need more one-on-one attention for particular skills, or it may motivate a teacher to consult with other teachers and supervisors for suggestions on further instructional strategies. Whatever the results, they should be shared with parents, and the assessments should be repeated periodically to evaluate the children's progress.

Effective Pre-K Programs Should:

- **Use multiple forms of assessment.**
- **Track individual children's progress in a scientifically reliable way.**
- **Use assessment to inform instruction.**

Skilled early childhood teachers embed systematic observations and other assessments in children's every day activities and interactions; children under skilled teachers do not feel examined or tested but rather will benefit from a tailor-made educational experience. With the knowledge derived from assessments, teachers and others can make certain that young children receive essential services and supports, including further assessment and intervention when necessary.

National Association for the Education of Young Children Position Paper: "Developmentally Appropriate Practice in Early Childhood Programs Serving Children from Birth through Age 8"* Assessing children's learning and development

Assessment of individual children's development and learning is essential for planning and implementing appropriate curriculum. In developmentally appropriate programs, assessment and curriculum are integrated, with teachers continually engaging in observational assessment for the purpose of improving teaching and learning.

Accurate assessment of young children is difficult because their development and learning are rapid, uneven, episodic, and embedded within specific cultural and linguistic contexts. Too often, inaccurate and inappropriate assessment measures have been used to label, track, or otherwise harm young children. Developmentally appropriate assessment practices are based on the following guidelines:
A. Assessment of young children's progress and achievements is ongoing, strategic, and purposeful. The results of assessment are used to benefit children—in adapting curriculum and teaching to meet the developmental and learning needs of children, communicating with the child's family, and evaluating the program's effectiveness for the purpose of improving the program.
B. The content of assessments reflects progress toward important learning and developmental goals. The program has a systematic plan for collecting and using assessment information that is integrated with curriculum planning.
C. Assessments are tailored to a specific purpose and used only for the purpose for which they have been demonstrated to produce reliable, valid information.
D. Decisions that have a major impact on children, such as enrollment or placement, are never made on the basis of a single developmental assessment or screening device but are based on multiple sources of relevant information, particularly observations by teachers and parents.
E. To identify children who have special learning or developmental needs and to plan appropriate curriculum and teaching for them, developmental assessments and observations are used.
F. Assessment recognizes individual variation in learners and allows for differences in styles and rates of learning. Assessment takes into consideration such factors as the child's facility in English, stage of language acquisition, and whether the child has had the time and opportunity to develop proficiency in his or her home language as well as in English.
G. Assessment legitimately addresses not only what children can do independently but what they can do with assistance from other children or adults. Teachers study children as individuals as well as in relationship to groups by documenting group projects and other collaborative work.

* From "Guidelines for Decisions About Developmentally Appropriate Practice: Developmentally Appropriate Practice in Early Childhood Programs Serving Children from Birth through Age 8." NAEYC position statement, July 1996. The recommendations of the NAEYC can be found on the web at http://www.naeyc.org/resources/position_statements/positions_intro.asp.

Examples of Formal Assessments

Get Ready to Read Screener: The "Get Ready to Read Screener" (Whitehurst and Lonigan) is a 20-item brief measure of early literacy skills for preschool children. It can be given by teachers, and there is a parent version for use by families in their homes. It is a valid measure of school readiness and is most effective if given two to three times a year. It provides information about children's knowledge of vocabulary, letter-sound matching, and phonological awareness skills.

mCLASS: CIRCLE: Researchers and educators at the Center for Improving the Readiness of Children for Learning and Education (CIRCLE), developed the mCLASS: CIRCLE as a handheld software program that enables early childhood educators to keep track of each child's degree of development in letter naming, vocabulary, and phonological awareness. With this understanding, teachers can maximize their ability to make use of the particular classroom activities the program suggests for the entire class, groups of children with needs in a specific area, or individual children with particular needs. The program also gives teachers access, via their handheld system, to Websites with tools for reporting, classroom planning, and the option to print class, group, and individual reports.

Endnotes

Chapter I

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About the Author

Susan Landry

Dr. Susan H. Landry is a developmental psychologist and the Michael Matthew Knight Professor in the Department of Pediatrics at The University of Texas Health Science Center at Houston. She is the chief of the Division of Developmental Pediatrics and the director of the Center for Improving the Readiness of Children for Learning and Education (CIRCLE) in the Department of Pediatrics. CIRCLE was named by Governor Rick Perry as the Texas State Center for Early Childhood and works with hundreds of early childhood educators across the state. Dr. Landry conducts numerous research projects and training activities with the goal of promoting quality learning environments for young children. The many large scale parenting and early education classroom projects are carried out across Texas and in communities in many other states and are described in numerous publications. A large research database on early childhood has been developed from Dr. Landry's numerous research programs supported by the National Institutes of Child Health and Development, The Institute for Education Sciences, The U.S. Department of Education, and the Texas Education Agency. Dr. Landry has been a featured speaker at Laura Bush's White House Summit and mini White House Summits held across the United States discussing cognitive development in young children.